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DISEASES CAUSED BY BACTERIA AND FUNGI.

CHRISTIANSEN, M., & NIELSEN, F. (1934). Undersøgelser over Infektionsvejene ved Kvaegets Streptokokmastitis. [**Investigations into the Mode of Infection in Streptococcal Mastitis**].—*Maanedsskr. Dyrlaeg.* **46.** 445-463.

This article consists of the report submitted by the authors to the 11th International Veterinary Congress, held in New York in 1934. On the whole the experiments carried out show that streptococcal infection of the udder under natural conditions can hardly be supposed to arise in any other manner than by the galactogenous route. Injuries to the tip of the teat increase the possibility of the infection. As the authors believe that most cases of mastitis occur without preceding injury to the teat sphincter, and as they have been unable artificially to produce mastitis by means of external infection of the teat, when the teat sphincter was uninjured, it must be supposed that, under natural conditions, still unknown factors are active, determining the invasion of the bacteria through the teat canal.

—H. C. BENDIXEN (COPENHAGEN).

ROSELL, J. M. (1934). **The Most Practical Field and Laboratory Tests for Detection of Mastitis.**—*Sci. Agric.* **15.** 169-175.

A series of chemical tests for the detection of mastitis are described (catalase, chloride content, etc.). Their use in the diagnosis of the subclinical form of mastitis due to *Streptococcus agalactiae* is based upon the determination of certain changes in the character of milk drawn from separate quarters. Definite conclusions cannot be drawn from the chemical examination of mixed samples. The most important alterations are detailed and it is suggested that their detection by chemical means is the most practical method of diagnosis. It is stated that milk substances elaborated by gland cells decrease in diseased udders, whereas there is an increase in products of an inflammatory nature. The simultaneous employment of two or more chemical tests raises the standard of accuracy. A routine method of examination is described by the author. Diagnostic measures for use in the laboratory and field are described in some detail.—A. L. MULLEN.

BENDIXEN, H. C. (1934). Undersøgelser af eksperimentelle Yverinfektioner, der er opstaaet i Maelkekirtler, hvis Pattekanal var beskadiget, og hvor Smitstoffet – en Streptokok hørende til Str. agalactiae-Gruppen – var paaført

Patten ved Malkning med inficeret Haand. [**Experimental Udder Infection following Teat Wounds**].—*Medlemsbl. danske Dyrlaegeforen.* **17.** 480-489, 495-521 and 527-549. 2 figs. [46 refs.]

In continuation of the results of earlier work [this *Bull.* **4.** 602.] the author has carried out infection experiments on five cows and heifers. Nine teats were treated by introduction of an ordinary teat slitter into one or more teats in each animal, careful antiseptic precautions being taken, and the incision being made as small as possible. Twenty-four to 96 hours after the operations the teats were milked, one after another, with streptococci-infected hands. Later, streptococci could be isolated from the milk from eight out of nine injured glands but from none of the control glands with a normal teat canal. Even though the same streptococcus strain and the same manner of injuring the teats were employed in all the experiments, the resulting infections differed considerably in their course – probably a natural consequence of the low virulence of this *Str.agalactiae* strain, which corresponded fully to most of the strains of this type. In the initial stage the infection was sub-clinical. On the 11th day after infection one gland showed clinical symptoms. Later the other glands also showed symptoms, the latest being on the 105th day. The infections continued partly in a clinical and partly in a sub-clinical form. The experiment illustrates the connection found in practice between injury to the tip of the teat and streptococcal infection. Some prophylactic problems are discussed.—H. C. BENDIXEN (COPENHAGEN).

TRUCHE, & DUCLOS. (1934). Septicémie apoplectiforme chez la poule. [**Apoplectiform Septicaemia of the Fowl**].—*Bull. Acad. vét. Fr.* **7.** 368-371.

An outbreak of apoplectiform septicaemia [see also this *Bull.* **4.** 302.], due to a haemolytic streptococcus, is recorded amongst a flock of the faverolle breed. Symptoms, *post-mortem* findings and bacteriological methods are detailed. Vaccination, both by dead and living organisms, was not successful and the authors state that, so far, no specific treatment is known. Although not frequently recorded in France, they have met with an odd case each year for the last 15 years. A review of recorded cases concludes the paper.—J. E. WILSON.

—. (1935). Deutsches Reich. Rundschrieben des Reichsministers des Innern an die Landesregierungen, betr. Untersuchung ausländischer Trockenhäute auf Milzbrand. [**Germany : Circular on Examination of Imported Hides for Anthrax**].—*Reichsgesundheitsblatt.* **10.** 97-98. 1 table.

Draft rules circulated to local authorities, providing for the examination of imported dry hides by means of the Ascoli precipitin test, so as to ensure their freedom from anthrax infection.—F. BULLOCK.

STERNINE, E. A. (1934). **Diagnosis of Anthrax in Hides.**—*Sovyet. Vet.* No. 11. pp. 17-18. [Abst. from French summary].

The author has confirmed the value of the method described by BRACHRACH and PACKOMOFF [(1933). *Z. Infektkr. Haustiere.* **44.** 89]. This concerns the histological examination of raw hides for anthrax. The bacilli are found in the blood-vessels or surrounding connective tissue of all layers of the skin except the epidermis.—C. V. WATKINS.

RAUTMANN, H. (1935). Rindertuberkulosebekämpfung mit Hilfe der Tuberkulin Reaktion und auf Grund von Sputum-Untersuchungen bei sämtlichen Tieren. [**Value of Tuberculin Tests and Bronchial Mucus Examination**]. —*Dtsch. tierärztl. Wschr.* **43.** 89-93. 2 tables. [3 refs.]

The diagnosis of tuberculosis has been studied in five herds of cattle, the tuberculin test being compared with the examination of bronchial mucus for tubercle bacilli. In two-thirds of the cattle the ophthalmic tuberculin test was used, in the remainder the double intradermal test. Of 249 cattle subjected to the tuberculin test, 167 gave positive reactions. Of these, 51 per cent. were revealed by the ophthalmic test and 94 per cent. by the intradermal test. From this same group, tubercle bacilli were isolated from the bronchial exudate in only 59 instances. The value of the examination of bronchial exudate depends largely upon the degree of control of tuberculosis exercised in the district in question. Where control is strict and " open tuberculosis " rare, the examination of exudate is relatively valueless.—E. J. PULLINGER.

ARANY, G. (1934). A galambok gümokórja és annak korai felismerése. [**Diagnosis of Tuberculosis in Pigeons**].—*Allatorv. Lapok.* **57.** 209-215. [18 refs.] [Abst. from abst. in *Bull. Inst. Pasteur.* **33.** 352].

The author describes tuberculin tests on carrier pigeons. In 86 per cent. of cases the results were in agreement with the *post-mortem* examinations. The infection was usually characterized by arthritis and nodular skin lesions.—J. E.

MUNRO, W. T., & WALKER, G. (1935). **Pulmonary Tuberculosis due to the Bovine Type Tubercle Bacillus. A Case Report with Autopsy Findings.**—*Lancet.* **228.** 252-255. 2 figs. [9 refs.]

A detailed account is given of a girl of 11 years of age who died from tuberculosis due to the bovine type of bacillus. After the age of 13 months she had been given cow's milk unboiled and the first sign of infection was enlarged glands in the neck at 20 months of age. Removal of glands had been carried out and during the last year of life tubercle bacilli of the bovine type had been isolated from sputum and urine. The clinical course was one of steady deterioration and, *post mortem*, there were extensive tuberculous lesions of the lungs with cavitation, mediastinal lymph glands, mesenteric lymph glands and kidneys. The disease was wide-spread and steadily progressive.

Cultures from the sputum, cervical gland and urine were virulent for rabbits, and there appeared to be no doubt that the organism was of bovine type of full virulence.—R. LOVELL.

CHADWICK, H. D. (1935). **The Incidence of Tuberculosis in School Children.**—*J. Amer. vet. med. Ass.* **86.** 375-381. 1 table.

A ten-year programme in Massachusetts was designed to throw some light on tuberculosis in children. Approximately 400,000 school children were examined by the tuberculin test and X-ray films of the chest were made on 100,000 of them. It is concluded that the rate of infection rises from 15 per cent. at the age of five to 45 per cent. at the high school age, infection being twice as frequent in children with a history of contact. Only one in 1,200 younger children showed tuberculosis of the adult type whilst of the high school students one in about every 400 tested showed evidence of pulmonary tuberculosis.

The childhood type of tuberculosis shows very little involvement of the lungs, and with adequate care the course is mild and tends to heal, provided that the children are guarded against fresh infection.

The adult type is pulmonary and such patients are a menace to " in contacts " and their prospect of recovery is poor.

Bovine tuberculosis is being rapidly eliminated in Massachusetts and this

fact is reflected in the decreasing incidence of tuberculosis of children associated with infection with the bovine type.

Of 200 human beings examined from an institution for the care of patients with bone and joint tuberculosis, the cause of disease in 71 per cent. of those under five years of age and 27·5 per cent. of the whole was the bovine type of bacillus.

Since the introduction of pasteurized milk in 1910, tuberculosis other than pulmonary has decreased in its incidence from 46 to 5 per 100,000, whilst the pulmonary type has also decreased from 133 to 47 per 100,000.

There is evidence, therefore, that tuberculosis of both bovine and human types is being brought under some control.—R. LOVELL.

LAPORTE, R., & BATTAGLINI, U. (1935). Etude des caractères de culture des bacilles tuberculeux bovins dysgoniques. [**Growth Characteristics of** *Mycobact. tuberculosis*, **Bovine Type**].—*C. R. Soc. Biol. Paris.* **118.** 302-303.

Tubercle bacilli, isolated from bovine and porcine lesions according to Löwenstein's method, exhibited dysgonic growth on Löwenstein's medium, glycerinized potato, glycerin broth and Sauton's synthetic medium. Besredka's medium, however, yielded an abundant growth and is excellent for primary isolation from tissues that have been submitted to Löwenstein's technique. On certain media, at least, dysgonic habit of growth is related to the state of hydration inasmuch as abundant growth has been obtained on non-glycerinized Löwenstein's medium which, after the addition of one-quarter of its volume of ordinary broth, was coagulated at 85°C. in an atmosphere of steam.—J. W. EMSLIE.

LAPORTE, R., & BATTAGLINI, U. (1935). Etude des caractères morphologiques et de la dissociation des bacilles tuberculeux bovins dysgoniques. [**Morphological Characters and Dissociation of** *Mycobact. tuberculosis*, **Bovine Type**].—*C. R. Soc. Biol. Paris.* **118.** 304-305. 1 fig. [2 refs.]

Bovine strains of tubercle bacilli, of dysgonic growth on the usual laboratory media, exhibit abundant growth in Besredka's medium. Growth in the latter pabulum resulted in dissociation of smooth dysgonic colonies into wrinkled eugonic colonies from which were derived strains that grew luxuriously on all the usual media. Such dissociation was not associated with any loss of virulence.—J. W. E.

SAENZ, A., & COSTIL, L. (1934). Propriétés biologiques et nombre des variétés dissociées en particulier des cultures de Bacilles tuberculeux d'origine aviaire. [**Biological Characters and Number of Dissociated Variants of Cultures of** *Mycobact. tuberculosis* **(Avian Type)**].—*C. R. Soc. Biol. Paris.* **117.** 852-855. [5 refs.]

In this article the authors report on their investigations into the variation of types of tubercle bacilli (avian strain). They agree that there are four types of avian bacilli named by them, S (smooth), R (rough), F and S (flat and smooth) and Ch (chromogenic) and have shown in their experiments how these can be isolated and identified on appropriate culture media. Their experiments include an investigation upon the virulence of the different types of avian tubercle bacilli on inoculation into animals and they conclude :– (1) that their F and S type could not be regarded as an entity ; (2) that the Ch type, although possessing characteristics clearly distinct from the R and S types, responded in the same way on animal inoculation as the R type, and (3) that the two definitely distinct types are the R and S, the former causing typical avian tuberculosis and the latter an inflammatory septicaemic type of the disease, the former being the one to occur naturally.

—K. D. DOWNHAM.

BIRKHAUG, K. E. (1935). Etudes sur la dissociation du *Mycobacterium tuberculosis*. [**Dissociation of** *M. tuberculosis*].—*Ann. Inst. Pasteur.* **54.** 19-70. 39 figs., 5 tables, 2 graphs.

It is advocated that guinea pigs be inoculated direct into a cervical lymphatic gland in order to produce colonial variants of tubercle bacilli. Blood cultures on Löwenstein's medium give more regular results by this than by *in vitro* methods alone. Tables are given showing the relative proportions of R, S and Ch (chromogenic) variants obtained in this way, the percentages being as follows :–

Avian type	R 4·1	S 95·1	Ch 0·8
Bovine type	R 85·6	S 12·9	Ch 1·4
Human type	R 93·1	S 6·8	Ch 0·1

When grown in Sauton's medium and in glycerin broth the pH of the medium varied, and with growth of R strains of avian type increased from 7·4 to approximately 5, whilst with S strains it fell to about pH 8. On the other hand, human and bovine types acted in a reverse manner, the R types reaching a pH of 7·8 to 8, whilst the S types varied from 6 to 4. There appeared to be rather less variation with the human than with the bovine types, but in all cases growth for many weeks was essential.

The S variety of the avian type is very virulent for fowls and rabbits and feebly virulent for guinea pigs, producing in fowls and rabbits a septicaemia accompanied by toxic manifestations and hypertrophy of various organs, whilst both R and Ch varieties are relatively avirulent for these animals. On the other hand the R variety of the bovine type is very virulent for guinea pigs and rabbits, producing a generalized tuberculosis, the S variety being relatively avirulent. [In a previous paper – this *Bull.* **4.** 526. – Birkhaug points out that BCG forms an exception to this rule, the R variant being avirulent for these animals]. The Ch variety of the bovine type is also avirulent for experimental animals.

Other details concerning the description of colonies, type of growth in fluid media, staining and morphology of individual organisms, agglutination by acid and biochemical reactions are cited.—R. LOVELL.

BÉNESI, L., & DOMMA, K. (1934). Beitrag zur Kultur des Typus bovinus. [**Culture of the Bovine Type of** *Mycobact. tuberculosis*].—*Z. Tuberk.* **71.** 24-26. 1 table.

For the cultivation of the bovine type of *M. tuberculosis* from caseating lesions, the best results were obtained if the infected material was emulsified and allowed to mix with 25 per cent. sulphuric acid for five minutes. Concentrations of 15 and 20 per cent. were also useful.—E. J. PULLINGER.

SVANBERG, V. (1934). Om odling av den bovina tbc-bakterietypen på glycerinhaltiga och glycerinfria substrat. [**On the Growth of Tubercle Bacilli with and without Glycerin**].—*Skand. VetTidskr.* **24.** 621-639. 4 tables. [10 refs.] [English summary : abst. from orig.]

The growth of the bovine type of *Mycobact. tuberculosis* has been examined on three variations of Löwenstein's culture medium, viz. with 0·75 per cent. glycerin, with 1·5 per cent. tuberculin, and in medium free from both glycerin and tuberculin. The strains employed for the examinations originated from pulmonary and genital mucus and udder secretion of cows with open tuberculosis of these organs. The specimens were made homogeneous by means of sulphuric acid 5 per cent. by volume. The cultures were examined three and five weeks and two months after inoculation. The best growth, i.e., the greatest number of positive specimens, was found in the medium that did not contain glycerin or tuberculin.

In a few cases growth was obtained only in the medium that contained glycerin or tuberculin. Growth was obtained in 88 per cent. of all the microscopically positive specimens. This comparatively low figure was due partly to contamination of the cultures and partly to a fall in the pH of the medium during the period of observation. It is difficult to render specimens of pulmonary and genital mucus homogeneous with sulphuric acid.—H. C. Bendixen (Copenhagen).

Dunkin, G. W. (1935). **A Possible Case of Congenital Johne's Disease.**—*J. comp. Path.* **48.** 36-40. 3 figs. [2 refs.]

A calf born of an animal affected with advanced Johne's disease was removed from its dam immediately after birth and kept in surroundings which precluded any contact with this disease. At one month of age it gave a positive reaction to johnin : on subsequent occasions (6 months, 12 months and three and a half years), it again reacted to the test. Apart from a slight temporary diarrhoea at 12 months, it remained healthy until three and a half years old when marked diarrhoea and wasting supervened. The animal was slaughtered and showed extensive macroscopic and microscopic evidence of Johne's disease.

The case is considered by the author to be one of congenital Johne's disease. —R. E. Glover.

Smythe, R. H. (1935). **The Clinical Aspect of Johne's Disease.**—*Vet. Rec.* **15.** 85-86.

The author stresses the early symptom of intermaxillary oedema in cattle, pointing out that the disease may exist without any other symptom being present, and that it may even come to a fatal termination without the usual sign of diarrhoea ever being evident. It is suggested that in the type in which the course is rapid there may be secondary factors at work. In predisposition to the disease, breed, high milk yield and heredity are suggested causes. Parturition, long journeys and over-exposure are blamed for precipitation of the clinical symptoms. The author supports Spicer's theory of mineral deficiency as he has observed that the geology of a particular area has a distinct bearing on clinical Johne's disease. It is noted that tuberculosis, when it does occur along with Johne's disease, has always been contracted previously, and the writer suggests a possible line of research to demonstrate whether the causative organism or its products gives some degree of protection against the tubercle bacillus.—John Reid.

Souckin, M. J. (1934). **Infectious Metritis in Rabbits [Corynebacterium Infection].**—*Sovyet. Vet.* No. 11. pp. 49-53. 2 tables. [Abst. from French summary].

This disease may be enzootic or sporadic. Generally there is great lassitude and hyperaemia and swelling of the vulva and vagina, with a blood-stained discharge ; 60 per cent. of the infected animals may die, and abortion occurs in pregnant survivors. Autopsy shows hypertrophy of the uterus and chronic (sometimes necrotic) metritis. The liver may show necrotic foci. Detailed biochemical reactions of the haemolytic corynebacterium isolated are given. Experimental transmission is easy (also to white mice) and always causes abortion in pregnant rabbits. An agglutination test may be used.—C. V. Watkins.

Schoening, H. W., & Creech, G. T. (1935). **Serological Studies of Swine Erysipelas with Particular Reference to Agglutination.**—*J. agric. Res.* **50.** 71-79. 3 tables. [3 refs.]

Eight pigs were exposed to swine erysipelas infection by injection with broth

cultures of *Erysipelothrix rhusiopathiae* and a study was made of the appearance of agglutinins in the blood of these animals. Six of the pigs, which were three to four months old, developed clinical symptoms of swine erysipelas and agglutinins were demonstrated from the third to the sixth day after injection, indicating that agglutinins make their appearance early in the disease. The other two pigs, three weeks old, failed to show any clinical evidence of infection and agglutinins were not detected.

Agglutinins were not demonstrated in the blood of a pig affected with the urticarial form of swine erysipelas nor in normal human sera. In one case, however, agglutinins were demonstrated in the blood of a human being suffering from an *E. rhusiopathiae* infection.

A description is given of the technique of a rapid serological method of identifying cultures of *E. rhusiopathiae*.—F. BLAKEMORE.

LISAC, M. (1934). Sur la présence de la pasteurella chez le porc sain ou atteint de pneumonie contagieuse. [**Presence of Pasteurella in Healthy Swine and in Swine Affected With Contagious Pneumonia**].—*Thesis for Docteur vétérinaire, Lyons.* pp. 51. [39 refs.]

Lisac, after reviewing the literature on the subject, made bacteriological examinations of 265 slaughtered swine, and came to the following conclusions :–

Pasteurella suiseptica is easily demonstrable in the bodies of healthy, freshly killed animals. Its morphology and staining characters allow of a sure identification. In 15 pigs killed for emergency reasons, the pasteurella was found in the lungs in 12 cases and sometimes in other organs. In 200 animals which appeared healthy when alive, but which had thoracic lesions at slaughter, the pasteurella was found 101 times in pure culture and 17 times associated with other organisms. In 50 animals healthy before slaughter, and with no visible lesions afterwards, the organism was found in the lungs on 13 occasions and in some cases in other organs.
—A. W. N. PILLERS.

SCHLOTTHAUER, C. F., THOMPSON, L., & OLSON, C., Jr. (1935). **Tularemia in Wild Gray Foxes : Report of an Epizootic.**—*J. infect. Dis.* **56.** 28-30. 1 table. [4 refs.]

Tularaemia had not previously been recorded in foxes. An investigation by the authors demonstrated that the wild, grey variety is susceptible to the disease. A fatal epizootic in this species is described. The red fox is said to be resistant to tularaemia—A. L. MULLEN.

MCBRYDE, C. N. (1934). **Acute Enteritis in Young Pigs due to Infection with Colon Group.**—*J. Amer. vet. med. Ass.* **84.** 36-50. 1 fig., 5 tables. [6 refs.]

The disease occurred on a farm containing many thousands of pigs, and also occurred on other farms rearing large numbers of pigs. All the farms used garbage. Previous to the investigation various methods of treatment had been adopted including the use of various diets other than garbage. It was found that sows taken off garbage some weeks prior to farrowing had litters which did not suffer so extensively as litters from sows kept the whole time on garbage. The results obtained, however, did not justify the conclusion that the disease was due to garbage-feeding. Thorough disinfection of buildings and washing of the sows was carried out without success.

The disease occurred in pigs two to five days old. The symptoms were those of weakness and unsteady gait, wrinkled skin and drowsiness, the pig standing

with head down to the ground as if in a state of stupor. A large number showed diarrhoea. The disease was not contagious.

Post mortem, a severe enteritis affecting the duodenum and jejunum were the chief lesions seen. The intestinal wall was hyperaemic and parts had a bubbly appearance. A bacteriological study of various organs revealed the presence of *Bact. coli.* No other organism was isolated and the author considers that the disease is caused by *Bact. coli.*

Agglutination tests of the sows revealed wide-spread prevalence of brucella infection. It was assumed that this infection, together with extensive inbreeding, were the primary factors in producing litters of lowered resistance.

When pigs were removed from the sows immediately after farrowing, kept away for four hours and then given the colostrum, no disease occurred. This was explained by the fact that the meconium had travelled too far down the intestines for *Bact. coli* to find a suitable medium for growth.—N. H. BROOKSBANK.

—. (1934). **Control of Infectious Equine Abortion** – *Salmonella abortus equi.*—*Sovyet. Vet.* No. 11. pp. 86-90. [Abst. from French summary].

The first three parts of the paper give instruction regarding the symptoms, aetiology and diagnosis of the disease. The fourth part concerns preventive measures, including isolation of all purchased mares and foals for six weeks, no service of healthy mares by stallions which covered diseased mares the previous season and rearing in isolation of foals coming from infected premises, etc.

The fifth part concerns measures to be taken upon infected premises. These include obligatory bacteriological examination of all abortions ; isolation of mares with vaginal discharge, or foals with fractures or persistent diarrhoea ; destruction of aborted foals, and rigid disinfection of quarters, utensils and dung ; treatment of mares that have aborted ; prophylactic measures applied to attendants, and strict regulation of stud work.

Rules for the taking and sending of material for laboratory diagnosis are detailed.—C. V. WATKINS.

HOLTH, H. (1933). Resultatene av bekjempelsen av den smittsomme kastning hos storfeet og videre retningslinjer for dette arbeide. [**Results Attained in combating Contagious Abortion in Cattle and Procedure for Continuation of the Work**].—*Norsk VetTidsskr.* **45.** 1-61, 75-123, 146-185 and 210-232. 21 tables. [English summary : abst. from orig.]

The author first gives a survey of what is known about the origin and spread of bovine contagious abortion in Norway. The disease has probably existed in that country for a long time but, as there was little intercourse between the districts and the trade in cattle was not important, it did not spread very much : little attention was, therefore, given to it. As communications and dairying industry increased, the infection spread all over the country and threatened to become a real danger to the industry. The veterinarians were already aware of the contagious nature of the disease and the damage caused by it. They took steps to control it, but, as no official measures were taken, the disease spread steadily further. In 1903, 1905 and 1907, however, official regulations were issued whereby contagious abortion in cattle was included in the list of mild contagious diseases in farm animals, entailing obligatory notification and prohibition of the despatch of affected animals to markets, shows, common pastures, etc. However, these regulations did not have the desired results chiefly owing to the lack of an easy and reliable method of diagnosing the infection. It was not until 1912, when the agglutination test became trustworthy and was carried out free of charge at the

State Veterinary Institute, that any progress was noticed. From that time until 1932, 62,628 blood samples have been examined, of which 11,927 gave positive and 1,475 doubtful reactions. Thus sporadic (non-infectious) abortion in cattle occurs rather frequently.

Answers to enquiries sent to all veterinarians in the country show a steady, although slow, progress. The method recommended for clearing a herd of infection is slaughter of all reactors in the spring when the animals are going out to pasture. While they are at pasture the byre is cleaned and disinfected and left empty during the summer months. Before the animals are allowed to re-enter the byre in the autumn, they are tested again and reactors slaughtered. Later, blood-tests are taken every six months. By this method, herds may be cleaned in a comparatively short time, but the procedure is an expensive one for the owner. The author, therefore, proposes alterations in, and additions to, the present regulations, especially as regards governmental support to owners who want to clean their herds, and general control of the cattle trade. Further, the local public health authorities are asked to take into consideration the question of requiring that milk sold in a raw state shall be free from living brucella. This is the case in Oslo, where the raw milk must be supplied from clean herds only, and milk from infected herds must be pasteurized before delivery for consumption.

[By an order of the Ministry of Agriculture for Norway, dated the 29th November, 1934 – *Norsk VetTidsskr.* **47.** 31. – new regulations on bovine contagious abortion have been issued].—Gustav Naerland (Farsund).

Birch, R. R. (1934). **A Bang's Disease Survey of a Representative Dairy Township.**—*J. Amer. vet. med. Ass.* **84.** 854-862. 2 tables. [2 refs.]

This survey was made in New York State. Ninety-four herds contained five or less reactors (140 out of 1,691 animals) and 25 herds contained more than five reactors (253 out of 705 animals). Only one bull out of 110 reacted. The abortion rate was nine times greater in reactors than in clean cows. Herds averaged 20 animals, and many were found free while others could readily be freed from this disease. The survey showed the necessity of regulating markets. Culls from badly infected herds could be profitably replaced by selected reactors from relatively clean herds. The latter should be used as breeders, calves being removed to separate farms when nine months old. Purchasing rather large groups of clean animals from one herd, instead of single animals of unknown status, was found a growing and desirable practice.—C. V. Watkins.

Lübke, A. (1934). Ueber die Nierenveränderungen Banginfizierter Kälber und ihre Beziehung zur weissen Fleckniere. [**Kidney Changes in** *Br. abortus* **Infection of Calves**].—*Dtsch. tierärztl. Wschr.* **42.** 624-627. 2 figs., 1 chart. [25 refs.]

Two calves were infected artificially with *Br. abortus*, the one immediately after birth by means of an intravenous injection of virulent culture, the other when five weeks old by an intramuscular injection. The first calf showed a febrile reaction, which appeared immediately after the injection, the temperature varying between 40° and 41°C. for five days. On the sixth day the calf died. On section, the kidneys showed foci of cellular infiltration of the interstitial tissue with endothelial cells, monocytes and lymphocytes. These foci were situated around small arterioles, some of which were blocked with such cells. The glomeruli showed no marked changes. The second calf recovered from the infection and developed a strong antibody reaction. It was killed two and a half months later. The lesions in the kidney were similar to those seen in the first calf, but they were of a more

chronic type and larger, being visible to the naked eye as circumscribed white nodules lying just below the capsule as well as in the depths of the kidney. *Br. abortus* was isolated culturally from two kidneys obtained from different carcasses at an abattoir. In both cases the kidneys showed macroscopic lesions similar to those described above.—E. J. PULLINGER.

KRANEVELD, F. C., & DJAENOEDIN, R. (1934). Anaërobe bacillen en de door hen veroorzaakte infecties bij de huisdieren in Nederlandsch-Indië. XII. Het voorkomen van den gasbacil van Fraenkel in straatstof, aarde, enz. XIII. Het voorkomen van den gasbacil van Fraenkel in den darminhoud en de faeces van gezonde honden en katten. XIV. Het voorkomen van den Fraenkel'schen gasbacil in den inhoud van den einddarm bij gezonde varkens. [**Anaerobic Infections of Domestic Animals in the Dutch East Indies. XII. Occurrence of *Clostridium welchii* in Soil, etc. XIII. *Cl. welchii* in the Intestine of Healthy Dogs and Cats. XIV. *Cl. welchii* in the Rectum of Healthy Pigs**].—*Ned.-ind. Bl. Diergeneesk.* **46.** 94-98, 284-287 and 395-399. 1 table. [1 ref.] [English and German summaries : abst. from orig.]

Cl. welchii was found in all of 50 samples of soil or dust from public places, and from the rectal contents of 25 dogs, 25 cats and 50 pigs living in the neighbourhood of Buitenzorg. The organism was identified by cultural methods and by testing for pathogenicity on guinea pigs.—J. E.

CATANEI, A. (1933). Etudes sur les teignes. [**Studies on Ringworm**].—*Arch. Inst. Pasteur Algér.* **11.** 267-399. 93 figs. on 13 plates, 6 tables, 8 charts. [23 refs.]

The chief interest of this clinical, epidemiological and parasitological study of human favus and trichophytoses lies in the experimental work which was carried out with :– (a) normal strains of *Trichophyton gourvili*, *Tr. pruinosum*, *Tr. glabrum*, *Tr. violaceum*, *Tr. langeroni* and *Tr. soudanense*, and (b) aberrant cultures of *Tr. acuminatum*, *Tr. pruinosum*, *Achorion schönleini* and a species of microïde (*Trichophyton radiolatum* = *Ctenomyces mentagrophytes*).

Detailed accounts of the morphological and cultural characters are given in earlier chapters, whilst the records of experimental infection may be summarized as follows :– guinea pigs are readily susceptible to all normal species mentioned except *Tr. violaceum* ; sheep to *Tr. pruinosum* ; calves to *Tr. pruinosum* and *Ach. schönleini* ; dogs to *Tr. violaceum* and *Ach. schönleini* ; a young cat to *Tr. violaceum*, and Algerian apes to *Tr. langeroni*, *Tr. soudanense* and *Ach. schönleini*. Mice were not readily infected by *Ach. schönleini*. Experimental infection was generally by inoculation of scarified skin but, in the case of *Tr. radiolatum*, some guinea pigs were successfully infected *per os* and rabbits by the intravenous route. In the latter, lesions appeared on the dorsal skin which had been scarified after intravenous inoculation, whilst contact experiments with guinea pigs indicated that transmission could take place through the medium of contaminated excrement.

Aberration of growth on artificial media was found to be associated with altered invasiveness. Thus, where the parasite was normally of the endothrix type, aberrant cultures were less invasive and the formation of spores was less pronounced or even completely absent. In the case of a normally ectothrix species, the variant was characterized by loss of the external sheath of spores.—J. W. E.

DISEASES CAUSED BY PROTOZOAN PARASITES.

TARANTINO, G. B. (1934). Tripanosomiasi animali esistenti nel comprensorio della Società Agricola Italo Somala (S.A.I.S.). Profilassi e trattamento

curativo. [**Animal Trypanosomiasis in Italian Somaliland**].—*Arch. ital. Sci. med. colon.* **15.** 431-450. 1 map. [2 refs.] [English, French and German summaries : abst. from orig.]

Trypanosomiasis causes heavy losses amongst livestock in Italian Somaliland although it is almost unknown in man. *Tryp. congolense* is the common trypanosome in cattle, which also harbour *T. vivax*. *T. brucei* attacks equines and *T. soudanense* causes a chronic illness amongst dromedaries. The only tsetse fly of importance in the area is *Glossina pallidipes* which attacks animals and game. Species of Tabanidae and *Stomoxys* are also responsible for the spread of *T. congolense*, *T. vivax* and *T. soudanense*. Certain prophylactic measures such as cutting and burning the grasses along the canal banks, keeping the canals dry after irrigation and reclaiming swamps assist in reducing the number of vectors. These measures, however, are not sufficient to control the infection and the author recommends that cattle suffering from *T. congolense* should be killed and that where possible animals should be worked at night.

In equines infected with *T. brucei*, 2 c.c. of " naganol " in 20 c.c. of water intravenously, repeated in 48 hours and again after eight days, has given fairly good results as has " neojacol " in dromedaries infected with *T. soudanense*. In bovines, 100 c.c. of a 1 per cent. solution of tartar emetic, given in two doses, the second 12 to 15 hours after the first, has given good results when the attack has been due to *T. vivax* ; no drug, however, has been found of any avail against *T. congolense*.—J. A. Nicholson.

Bertrand, I., Bablet, J., & Sicé, A. (1935). Lésions histologiques des centres nerveux dans la trypanosomiase humaine (à propos de deux cas mortels non traités). [**Histological Lesions of the Central Nervous System in Human Trypanosomiasis**].—*Ann. Inst. Pasteur.* **54.** 91-147. 13 text figs., 3 plates. [71 refs.]

This article records the findings of the histological examination of the brains of two men who had died of sleeping sickness without receiving treatment ; the lesions can, therefore, be considered as a pure neuropathological process. The essential lesion consisted of a diffuse meningo-encephalitis of a markedly infiltrative character. The perivascular infiltration exhibited a marked preponderance of plasma cells, not encountered in any other condition ; neuroglia and microglia elements and histiocytes were also present in the infiltration. The morula cells of Mott originate from plasma cells, but may be ingested by histiocytes or microgliocytes. The white matter of the brain was particularly rich in vascular lesions. The endothelium of vessels was tumefied but did not exhibit lymphoblastic transformation.—U. F. Richardson.

Rodhain, J., & Brutsaert, P. (1935). L'évolution des *Trypanosoma lewisi* et *Trypanosoma cruzi* chez *Melophagus ovinus*. [**The Development of** *T. lewisi* **and** *T. cruzi* **in** *Melophagus ovinus*].—*C. R. Soc. Biol. Paris.* **118.** 1228-1231. [2 refs.]

Attention is drawn to the lack of selectiveness, as regards the intermediate host, shown by trypanosomes belonging to the group in which the infective stages develop in the posterior station, and to illustrate this feature the development of *T. lewisi* and *T. cruzi* was studied in the sheep ked. The keds were obtained as pupae, fed on rats and guinea pigs during the day, and at night kept in tubes at a temperature of 25° C. in a humidity of 60°, under which conditions survival up to 20 days was obtained. Out of 24 keds fed on rats infected with *T. lewisi*, seven

developed an intestinal infection, and two showed development forms in the terminal intestine which proved infective to rats. Out of 42 keds fed on guinea pigs infected with *T. cruzi*, 20 per cent. developed an intestinal infection, and three of the insects were proved to contain infective stages.—U. F. Richardson.

Parrot, L., & Donatien, A. (1935). Sur la culture des *Leishmania* en milieu NNN " mouillé ". [**Cultivation of Leishmania on Moistened NNN Medium**]. —*Bull. Soc. Path. exot.* **28.** 39-40. [4 refs.]

The authors confirm the report of Nattan-Larrier and Grimard-Richard on the value of the addition of normal sodium chloride to tubes of NNN medium. After the growth of leishmania in the water of condensation, this can be removed and replaced by 2 to 3 c.c. of the normal sodium chloride and the tubes can then be reinoculated. In such tubes the cultures of the flagellates will survive for considerable periods, and living flagellates are recorded over a year after inoculation. —U. F. Richardson.

Walsh, F. E., McNutt, S. H., & Murray, C. (1934). **Trichomonas bovis Infection in Cattle.**—*Cornell Vet.* **24.** 60-74. 4 figs., 3 tables. [11 refs.]

This article records further observations on the infection of cattle in the United States of America with vaginal trichomonads. The authors assume that the percentage of infected herds throughout the state of Iowa is less than 10 per cent. of those herds exhibiting breeding trouble. With regard to pathogenicity, it is noted that breeding became entirely satisfactory when the trichomonad infection had been eliminated. Rabbits were found to be more satisfactory than guinea pigs for experimental infection. For clinical diagnosis, the existence of nodular vaginitis or the nature of the discharge was not found of value, but calcification of the uterine mucosa was encountered, and seemed to be confined to trichomonad disease of the uterus. For positive diagnosis, swabs of uterine discharge are recommended, and if these cannot be examined at once they should be kept moist with normal saline, and if kept at room temperature or below, they should be incubated for 18 hours at 35° to 37°C. before examination.

For eradication from a herd, the authors recommend, along with the usual hygienic and therapeutic measures, the removal of infected bulls, and that infected cows should not be used for breeding till they have recovered.—U. F. Richardson.

Salomon, S. (1935). Myocarditis sarcosporidica eines Schafes. [**Sarcosporidial Myocarditis in a Sheep**].—*Berl. tierärztl. Wschr.* **51.** 214. 1 fig.

In a sheep which was slaughtered on account of its listless behaviour, no lesions were detected except for an alteration of the heart muscle, which was greyish-red and exhibited light greyish-green nodules about the size of millet seeds. No parasitic structures could be seen with the naked eye, but on histological examination numerous sarcosporidia were detected in the muscle fibres, associated with a round-celled infiltration of the muscle tissue, a very large number of eosinophile cells lying in groups separating the individual muscle fibres.—U. F. Richardson.

Yakimoff, W. L., & Iwanoff-Gobzem, P. S. (1935). Abnorme Form der Eimeria smithi Yakimoff und Galouzo, 1927. [**Abnormal Forms of *Eimeria smithi* Yakimoff and Galouzo, 1927**].—*Berl. tierärztl. Wschr.* **51.** 214. 2 figs.

The authors record the detection in the faeces of cattle of coccidia which resembled *E. smithi*, except that a residual body was present in the oocyst. Small forms, 21 to 27μ by 15 to 16·5μ, resembling *E. smithi* were also present.—U. F. R.

MAYHEW, R. L. (1932-33). **Studies on [Fowl] Coccidiosis. III. Observations on Paralysis with Special Reference to Coccidial Infection. IV. Mortality and Infection among Artificially Inoculated Chickens.**—*Poult. Sci.* **11.** 289-292 and **12.** 206-210. 2 tables. [8 refs.]

MAYHEW, R. L. (1934). **Studies on Coccidiosis. V. Treatment with Powdered Buttermilk.**—*J. Parasit.* **20.** 230-242. 2 figs., 3 tables. [12 refs.]

MAYHEW, R. L. (1934). **Studies on Coccidiosis. VI. Effect of Early Attack on Egg Production. VII. Effects of Starvation and Removal of Caeca.**—*Poult. Sci.* **13.** 148-154 and 360-369. 3 figs., 8 tables, 2 charts. [11 refs.]

[For abst. of previous articles of this series, see this *Bull.* **2.** 645].

III. The data included in this article were obtained whilst the author was carrying out experiments involving artificial inoculation of fowls with coccidia under controlled conditions.

He quotes the reports of several workers who support the idea that paralysis is at present regarded as a reasonably accurate indication of the presence of chronic coccidiosis. He describes a type of paralysis in fowls where there is usually loss in weight and atrophy of the muscles of the affected parts and states that recovery rarely takes place. The evidence supplied indicates that nearly 41 per cent. of the affected birds were not affected with coccidia during their lifetime. Also he found that none of the birds developing paralysis were infested with roundworms, tapeworms or other intestinal parasites. Paralysis was noted in chickens from eight weeks of age to eight months and, in 13 of the 27 cases, this developed when the birds were 13 and 15 weeks old.

IV. A report is given of experiments dealing with coccidiosis over a period of three years.

Inoculations were made by means of a glass pipette introduced into the crop of six to seven-week-old chickens. The birds were comfortably housed at a temperature of 85° to 95°F. It was noted that a sudden drop in temperature seems to be one of the chief causes of death in the later periods of convalescence from coccidiosis.

The total number of deaths was 152 out of 671 inoculated birds, or 22·7 per cent. The largest number of deaths occurred on the sixth day following inoculation when 65, or 42·7 per cent., died. It is considered that the deaths occurring after the eighth day were largely due to other complicating factors, chiefly a fluctuating temperature of the compartment.

An interesting observation is made that chickens which have not developed haemorrhage and consequently show no symptoms of coccidiosis, pass a much larger number of oocysts in the droppings than those affected with haemorrhage. This point is of value when using hygienic measures in handling an outbreak of coccidiosis in a flock.

V. For the experiments 166 inoculated and 183 control birds were used. Before feeding with the test doses of powdered buttermilk, the chickens received a mash containing about 5 per cent. of this substance.

Inoculations were carried out when the birds were 42 to 46 days old. It had been noted in previous experiments that the most marked symptoms of the disease occurred on the sixth day following inoculation. It was, therefore, decided to commence treatment on the morning of the seventh day after inoculation.

One group of the inoculated and one group of controls were then supplied with 40 per cent. powdered buttermilk added to the mash for a period of two weeks and the remaining two groups with regular mash. The results obtained indicated that no beneficial effect on weight resulted from the use of 40 per cent. powdered buttermilk in the mash in the treatment of coccidiosis.

The author states that observations indicate the necessity for complete data, such as individual faecal examinations, diagnosis of haemorrhage and frequent weights and measures of the results of the treatment of coccidiosis in chickens. Emphasis should be placed upon environmental conditions surrounding the birds during convalescence. In fact, the author believes that the conditions must be better than it is practicable or economical for most poultry farmers to provide and that in the absence of such conditions the death rate will be influenced by factors other than disease.

VI. Birds six to eight weeks old were artificially infected with coccidia and the results noted. They were kept under conditions preventing parasitic infestation until 20 to 25 weeks old, when they were transferred to a laying house, with a group of control birds similarly housed and fed.

The results show that 79 birds which had been artificially infected when six to eight weeks old laid 19·25 per cent. fewer eggs per hen than the 103 controls. Thirty-one birds which had been severely affected with coccidiosis laid 45·51 per cent. fewer eggs and began to lay 6·6 weeks later than the controls. No cases of chronic coccidiosis occurred in the birds. Mortality was well distributed throughout the hens and it is concluded that an early attack of coccidiosis does not predispose to future attacks or to other diseases.

The writer states that where the growth of chickens has been affected by an early attack of coccidiosis, they will eventually attain normal weight but their growth will be retarded for five to six months after the attack.

VII. Experiments were planned to test the value of surgical removal of the caeca in the prevention of coccidiosis. Following the removal of the caeca and recovery of the birds they were infected with a culture of coccidia. Three of the six birds so treated developed very severe haemorrhage. No deaths occurred but the author states that only a weak culture was used. The removal of the caeca apparently caused no permanent effect on the growth of the young chickens and, when performed on laying pullets, had no permanent effect upon weight or egg production.

The conclusion is reached that the injurious effects resulting from coccidiosis are not due to the destruction of the function of the caeca following haemorrhage ; hence methods of treatment should not be directed on this line. The effects of coccidiosis on growth and weight are not due to the failure to eat during the period of sickness.—Norman Dobson.

Carré, H., & Avignon. (1935). L'anaplasmose du mouton dans la Nièvre. [**Ovine Anaplasmosis in the Nièvre District, France**].—*Rev. gén. Méd. vét.* **44.** 129-138. 4 figs., 2 charts. [1 ref.]

This article records observations made in connection with an outbreak of disease in sheep in the Nièvre district. The affected flock consisted of 150 animals which had been drawn from various districts, and it was found that the diseased animals all belonged to one lot. The autopsy of an affected sheep revealed slight jaundice, enlargement of the spleen and some hepatization of the anterior lobes of the lung. Blood smears revealed anisocytosis and an intense poikilocytosis, a leucocyte count showing a preponderance of mononuclear forms. No anaplasms were detected in these smears, but on subinoculation into another sheep, a typical anaplasma infection developed. The sheep were infested with ticks but the species was not determined. The authors consider that the mortality was due to anaplasmosis, and that this disease may be more wide-spread than is suspected, having been introduced from North Africa, and having escaped detection owing to the lack of attention given to diseases of sheep.—U. F. Richardson.

Carré, H. (1935). Ictère hémorragique et anaplasmose. [**Haemorrhagic Jaundice and Anaplasmosis**].—*Rec. Méd. vét.* **111.** 71-83. 4 figs.

Cuillé, Chelle and Cazaux reported the discovery of an anaplasmal infection of sheep in France in 1934, and suggested that ovine haemorrhagic jaundice, believed to be due to dietetic causes, was, in fact, an anaplasmosis. Carré endeavoured to confirm this by investigations of outbreaks of haemorrhagic jaundice in the eastern Pyrenees, but he was unable to detect anaplasms in the blood, or to demonstrate that the disease was transmissible by inoculation or conferred immunity against an Algerian strain of anaplasma. Whilst haemorrhagic jaundice was characterized by haemoglobinuria and a high polymorphonuclear leucocytic ratio, in anaplasmosis no haemoglobinuria was encountered, and leucocyte counts revealed a preponderance of monocytes.—U. F. Richardson.

Babudieri, B. (1934). Sulla presunta *Leucocytogregarina bovis* de Gasperi 1933. [**The So-Called** *L. bovis* **of de Gasperi**].—*Riv. Malariol.* **13.** 232-234. [1 ref.] [German summary : abst. from orig.]

The author considers that the reported discovery of *L. bovis* in the blood of cattle killed on account of theileriasis is incorrect. In the first place, the parasites described were only found in subendocardial haemorrhages and not in the spleen and, in the second place, the general description of them and the figures given might equally apply to the spores of *Sarcocystis cruzi*. These parasites are often found beneath the endocardium and it is probable that their spores accidentally found their way into blood smears through rupture of the cystic membrane which contains them.—J. A. Nicholson.

Dhont, C. M., Klarenbeek, A., Schüffner, W. A. P., & Voet, J. (1934). De leptospiroses bij der hond, ende beteekenis der Leptospira canicola. [**Weil's Disease due to** *Leptospira canicola*].—*Ned. Tijdschr. Geneesk.* **78.** 5197-5209. 5 tables. [1 ref.] [English and German summaries : abst. from orig.]

Leptospira infection of dogs was encountered fairly frequently in the Netherlands during 1933. The causal organism was usually *L. canicola*, though *L. ichterohaemorrhagica* was also encountered. The identification of the infecting strain of leptospira was based sometimes upon the isolation of the organism, but usually upon serological tests. *L. ichterohaemorrhagica* was always the infecting organism in typical acute cases of jaundice. Dogs showing an uraemia syndrome were usually infected with *L. canicola*. This latter organism is spoken of as an aberrant strain of *L. ichterohaemorrhagica*. *L. canicola* has been demonstrated in the urine of human beings, but has not yet been identified in the brown rat. —E. J. Pullinger.

Marmorston, Jessie. (1935). **Effect of Splenectomy on a Latent Infection, Eperythrozoon coccoides, in White Mice.**—*J. infect. Dis.* **56.** 142-152. 1 fig., 3 tables. [29 refs.]

Eight strains of mice were splenectomized and examined for infection with *E. coccoides*, and three strains were found to be carriers. The organisms appear as minute ring-like bodies with the cytoplasm, which stains red-blue with Giemsa, heaped up at one point in the circumference of the disc. In the greatest number of mice the organisms appeared in about 10 to 30 per cent. of the red blood cells. There was no anaemia or other manifestation of disease, and the eperythrozoon infection might be followed by a bartonella infection which was also mild. Carrier animals exhibit a hypertrophy of the spleen, and X-ray irradiation and experimental lymphomatosis led to the appearance of the blood infection. The author

discusses the influence of the spleen in protozoan immunity and refers to *Bartonella canis* infection in dogs.—U. F. Richardson.

DISEASES CAUSED BY VIRUSES.

I. Levaditi, C., Haber, P., & Hornus, G. (1934). Etude des rapports entre les bactéries, les ultravirus, les bactériophages, les toxines et les enzymes, au moyen de l'action exercée " in vitro " par la gonacrine. **[The Nature of Viruses].**—*Bull. Acad. Méd. Paris.* **112.** 573-586.

II. —. (1935). **The Nature of Viruses.**—*Lancet.* **228.** 99. [2 refs.]

I. The authors carried out experiments in which the viruses of herpes, vaccinia, poliomyelitis, rabies, the bacteriophage, and tetanus and diphtheria toxin and trypsin were exposed to the action of " gonacrine " (a dye of the acridine series) and light. The experiments were designed with a view to collecting evidence as to the nature of viruses – whether they belonged to the world of living things or not.

" Gonacrine ", which is bactericidal and has marked photodynamic action on the viruses, inactivated those of herpes, rabies and vaccinia and also bacteriophage, but had no action on the toxins or trypsin. With the exception of the virus of poliomyelitis, those mentioned behaved like living agents, and the evidence obtained adds to the mass which has already been accumulated in support of the living nature of the viruses.

II. This is a discussion on the nature of viruses and, in the main, refers to I.—D. R. Wilson.

Andrewes, C. H. (1934). **The Application of the Method of Tissue-Culture to Some Problems in Virus Pathology.**—*Arch. exp. Zellforsch.* **15.** 437-439. [4 refs.] [In English].

A short review of the value of the propagation of viruses in tissue culture with special reference to the significance of inclusion bodies in growing cells and the relative parts played by cellular and humoral immunity in such cultures. The paper contains no data on these subjects which have not previously been published. —R. E. Glover.

Barnard, J. E. (1935). **Microscopical Evidence of the Existence of Saprophytic Viruses.**—*Brit. J. exp. Path.* **16.** 129-133. 1 plate. [2 refs.]

An examination of tubes of Hartley's broth enriched with filtered horse serum frequently revealed the presence of a faint, uniform turbidity. Photomicrographs taken by dark-ground illumination using ultra-violet light showed in such cases innumerable particles similar in form to the bodies associated with known pathogenic viruses.

These bodies increased in numbers on incubation and were cultivated to the fourth generation. It is suggested that they may be examples of saprophytic or non-pathogenic viruses.—R. E. Glover.

Nagahata, S., & Ikegaya, S. (1934). **Variations of Plasma Protein Fractions and their Distribution during Rinderpest.**—*9th Rep. Govt. Inst. vet. Res. Fusan, Japan.* pp. 17-29. 19 tables, 10 graphs. [8 refs.] [Abst. from English summary Pt. 2. p. 3].

The authors record investigations on quantitative variations of the plasma protein factors carried out on nine calves inoculated with rinderpest. Little or

no change occurred before the attack of fever. The serum albumin, globulin and euglobulin showed a general tendency to decrease during the course of the disease. The quantities of fibrinogen and pseudoglobulins I and II were irregular, whilst the percentage of non-protein nitrogen increased markedly in the later stages of the disease.—U. F. RICHARDSON.

REPPIN, K., & PYL, G. (1934). Maul- und Klauenseuche oder Stomatitis vesicularis ? Experimentelle Untersuchungen zur Differenzierung eines amerikanischen Virusstammes. [**Foot and Mouth Disease or Vesicular Stomatitis ? Experimental Tests on the Differentiation of an American Strain of Virus**]. —*Arch. wiss. prakt. Tierheilk.* **68.** 183-194. 1 fig. [10 refs.]

In 1933 an outbreak of disease occurred among swine in California, the diagnosis being unsatisfactory. The clinical picture was rather like that of foot and mouth disease and, by adopting strict methods for isolation, hygiene and slaughter, the disease was eradicated. The American workers found that the cause was a filter-passing virus, which was not transmissible to cattle, sheep, or guinea pigs by natural or artificial means, but that horses and mules, as well as swine, could be infected by scarification of the mucous membranes. Swine only were naturally infected. In the horse, inoculation caused a condition resembling vesicular stomatitis, although less extensive, and in no case did secondary lesions occur. In swine, secondary lesions were numerous and the reaction resembled that of foot and mouth disease.

The authors received virus from America for identification. They confirm the American findings of the susceptibility of the various animals and point out that in very young pigs, inoculated intracutaneously in the snout, foot lesions do not commonly appear, but in well-grown swine foot lesions are common, and it is remarkable that fresh vesicles may occur as long as 11 days after infection. They were not able to observe any cross-immunity between the Californian virus and the three stock types O, A, and C, of foot and mouth disease, neither was immune and convalescent serum of Californian virus found to have any neutralizing action on foot and mouth disease virus. Types " Indiana " and " New Jersey " of vesicular stomatitis were tested on swine immune to the Californian virus and, while some of these animals failed to react, it must be remembered that swine have a low susceptibility to these viruses.

A further test carried out was the re-alkalization test ; in this the Californian virus conformed in its action to vesicular stomatitis and not to foot and mouth disease. Lymph collected from vesicles on swine was used, and the rapid switch of pH from 7·6 to 3 and back to 7·6 did not affect the viability. [The re-alkalization test depends upon the following facts. If foot and mouth disease virus is stored at 0°C. in buffer solutions of varying pH, it is found that at two points on the scale the virus retains its infectivity, e.g. in the weak alkaline region of 7·6 it remains viable for some months, and in the strong acid region of 3 it is viable for about ten days. These points are separated by the weakly acid region, in which the virus is destroyed. Vesicular stomatitis, on the other hand, remains viable anywhere between pH 3 and pH 12. The test consists of quickly acidifying virus from pH 7·6 to pH 3 ; both vesicular stomatitis and foot and mouth viruses will still be viable. On rapid re-alkalization, however, foot and mouth virus is destroyed, while vesicular stomatitis virus retains infectivity. It is claimed that this is a colloidal reaction and not a disinfection. It is essential that the virus tested be cell-free, e.g. filtered lymph and not epithelial suspension, otherwise intracellular virus may not be affected by the rapid switching of the pH range – see also this *Bull.* **5.** 486].

As a result of these tests the authors consider that the Californian virus cannot be regarded as a strain of foot and mouth disease, but may possibly be looked on as a type of vesicular stomatitis.—NORMAN HOLE.

WAGENER, K. (1933). Stomatitis vesicularis und Maul- und Klauenseuche. Eine kritische-experimentelle Vergleichsstudie. III. Mitteilung. Epizootologie, Differentialdiagnose, Bekämpfung. [**Vesicular Stomatitis and Foot and Mouth Disease. A Critical, Experimental and Comparative Study. Part III. Epizootology, Differential Diagnosis, Control**].—*Arch. wiss. prakt. Tierheilk.* **66.** 363-380. [41 refs.]

This article is a sequel to previous publications [see this *Bull.* **5.** 345.] and consists of a survey of relevant literature, to which extensive reference is made.

Vesicular stomatitis is normally a disease of horses, amongst which it can spread with amazing rapidity. The virus can, however, also infect cattle, in which case the question of the differential diagnosis from foot and mouth disease arises. No satisfactory serological test has been evolved to differentiate the two diseases, possibly because of the plurality of viruses found in both conditions. Until a satisfactory method of cultivating the viruses is discovered, the only vital test is whether the virus can or cannot infect horses, for these animals are not susceptible to foot and mouth disease. In the case of vesicular stomatitis, treatment is of a symptomatic type, but it is possible that the administration of antiserum prepared against the homologous virus strain may be of therapeutic value.

The relationship between the viruses causing the two diseases is discussed. It is concluded that they are very closely allied and may bear the same relationship as exists between the viruses of small pox and alastrim. [Alastrim is the name given to the mild form of smallpox commonly encountered at the present time. This mild form of the disease causes a mortality of about 0·2 per cent., as compared to that of 10 to 30 per cent. produced by the classical type].—E. J. PULLINGER.

NAIDU, P. M. N. (1935). Neurotropismus des virus der Stomatitis vesicularis. [**Neurotropism of Vesicular Stomatitis**].—*Z. InfektKr. Haustiere.* **47.** 203-214. 4 figs., 2 tables. [5 refs.]

The author has shown that normal strains of dermatotropic virus of stomatitis vesicularis may assume neurotropic affinities and retain such neurotropism through a series of transmission experiments consisting of intracerebral inoculation from brain to brain. Mice and guinea pigs were used for this purpose. Multiplication of two strains of virus in brain culture was also demonstrated during the course of eight and 16 sub-cultures. These neurotropic strains of virus produced low mortalities of 4 to 15 per cent. when injected into mice and guinea pigs. They differed from one another with regard to the lesions produced, the one producing an encephalomyelitis and the other a meningitis. A strong protective antibody reaction could be produced against the homologous, but not against the heterologous virus strain.—E. J. PULLINGER.

DIDIER, L. (1934). Peste équine ou typhus amaril du cheval. [**African Horse-Sickness**].—*Thesis for Docteur vétérinaire, Lyons.* pp. 111. 1 fig., 2 charts. [11 pp. refs.]

The first part of this thesis gives the results of the author's experience of African horse-sickness during six years' residence in Senegal and particularly the epidemics at Dakar in 1927 and 1928. It opens with a historical survey of the disease and then passes to a detailed study of symptoms and lesions. Three forms of the disease are recognized, viz., acute, subacute and suppressed. The author

made systematic blood examinations in all cases with negative results. There is an account of the results obtained with blood sedimentation tests and urine examination. Transmission experiments with guinea pigs, monkeys, goats, dogs and horses confirmed the findings of previous workers. Further chapters are devoted to the aetiology and spread of the disease, its treatment and prophylaxis. In the epidemic of 1927, in an artillery unit with 185 animals, 70 animals became affected (69 being mules) of which 30 died and 30 were cured.

The second part of the paper is a study of the points of resemblance between yellow fever of man and African horse-sickness. The author finds close analogy in the following :– seasonal incidence, a high incidence common to both diseases in certain years, type of causal agent, means of transmission, course, symptoms and lesions. He further finds that in *Aedes calopus* they have a common transmitting agent.

A clinical record of five cases of African horse-sickness is appended.—C. D.

VERGE, J. (1933). L'anémie infectieuse des équidés. Maladie de Vallée. [**Equine Infectious Anaemia**].—*Rec. Méd. vét.* **109.** 797-838. 2 figs., 2 charts. [2 refs.]

This article is a complete résumé of present-day knowledge in regard to equine infectious anaemia. Every aspect of the disease is considered, and the whole constitutes an exhaustive and authoritative work of reference of considerable value, which merits the special attention of teachers and students.

The author defines the condition as a virulent inoculable disease due to a filtrable virus, peculiar to the horse, mule and donkey and under certain conditions transmissible to man. Its essential characteristics are a progressive anaemia and a chronic course interrupted by numerous febrile periods.

The history of the disease is reviewed. There is a note on the nature of the causal agent and on animals which are susceptible. There is a record of the present geographical distribution of the disease and a discussion on the special conditions under which it most commonly occurs. The author then passes to a consideration of the period of incubation and symptoms. He recognizes four forms, viz. a septicaemic, acute (in three stages), subacute and chronic form. Each of these is described in detail. He does not recognize a latent form *per se*. A note on the disease as shown in the mule and donkey is included.

Pathological anatomy and histology are then dealt with, blood changes receiving special mention. The question of diagnosis is considered at some length and includes a reference to every method which has proved of any value. Animal inoculation methods are described. Special attention is given to the blood sedimentation tests, namely, the erythrocyte sedimentation test (indice de vitesse de chute) and the " volumetric index " (indice volumétrique). Considerable use has been made of these tests by continental workers and they are frequently referred to by name in French literature devoted to this disease. In the article under consideration, however, an illustrated and detailed account of the technique of each test is included and the formulae on which each index is based, the method of interpretation of results, the normal readings and those recorded in typical cases of the disease, are fully described. This is a reference item of considerable value. The mercuric chloride reaction of Fulton is similarly dealt with.

The remaining chapters are devoted to aetiology, methods of infection, treatment and prophylaxis.—C. DAVENPORT.

HILLMER, F. (1935). Die Verwendbarkeit der Sublimatprobe in den Pferdebeständen der Heeresverwaltung zur Ermittlung von Pferden mit anstecken-

der Blutarmut. **[Value of the Sublimate Test for the Diagnosis of Equine Infectious Anaemia]**.—*Z. Veterinärk.* **47.** 65-75. [24 refs.]

The author considers that a positive reaction to the sublimate test is by no means specific for infectious anaemia of horses. The test will pick out a very large proportion of infected animals, but it misses certain cases, including some where infection is latent. Until more is known of the fundamental causes of variation of the globulin content of the blood, the sublimate test will remain of empirical value only.—E. J. PULLINGER.

—. (1935). Statsmedel anslagna för bekämpandet av sjukdomen smittsam blodbrist hos häst. **[Regulations for Control of Equine Infectious Anaemia in Sweden]**.—*Skand. VetTidskr.* **25.** 73-74.

By a royal decree of April, 1934, the eradication of equine infectious anaemia in Sweden is made possible. The disease is most prevalent in the north of the country (Norrbotten province). The decree provides for periodical veterinary inspections of horses and for compulsory slaughter, compensation being paid.

It is stated that Norway has already eradicated the disease by a similar method. —J. E.

SÁLYI, J. (1934). Die histologischen Veränderungen im zentralen Nervensystem und in den Lymphknoten bei der Schweinepest und beim Paratyphus der Ferkel. **[Histological Changes in the Central Nervous System and in the Lymph Glands in Swine Fever and Paratyphoid of Young Pigs]**.—*Arch. wiss. prakt. Tierheilk.* **68.** 250-270. 4 figs., 1 table. [31 refs.]

After reviewing the literature of previous researches into the histological changes in the blood vessels, kidneys, lymphatic glands and brain, the author describes the changes which were produced in the brains of swine inoculated with swine fever virus, and also those of the central nervous system in swine affected with paratyphoid. He reaches the following conclusions :- (1) under the influence of a laboratory strain of swine fever virus, there arises in the central nervous system in 84·63 per cent. of cases a non-purulent inflammation of the brain ; (2) the causal agent of this inflammation is the neurotropic condition of different strains of laboratory viruses and it varies in activity ; (3) in cases of swine fever in practice, the inflammatory changes of the central nervous system tend to be less pronounced because the neurotropic condition of the " street " virus seems to be developed to a less degree ; (4) in acute paratyphoid (*suipestifer* septicaemia) there develops in the central nervous system a progressive and regressive process of the tunica intima of the capillaries which is followed by a cellular infiltration of the brain covering and tunica adventitia of the capillaries, and further of the ectodermal part of the brain ; (5) in the capillaries of the lymphatic glands somewhat similar changes take place in both swine fever and paratyphoid, but the chief change is a hyaline degeneration of the blood vessels in swine fever, and in paratyphoid changes of the endothelial cells which are progressive at first and later regressive ; (6) the blackish-red mottling of the lymphatic glands which takes place in swine fever and paratyphoid is due to the escape of red cells into the lymph spaces, and their slow movement into the culs de sac of the glands ; (7) by histological methods swine fever and paratyphoid cannot be distinguished with certainty: the presence of marked inflammation of the brain with hyaline degeneration of the blood vessels is, however, strong evidence of the presence of swine fever, and (8) histological research promises early success for the discovery of a method for the diagnosis of true swine fever.—A. W. N. PILLERS.

Zuwerkalow, D., & Ssolomkin, P. (1935). Ueber die Adsorption des filtrierbaren Schweinepestvirus. [**The Adsorption of Swine Fever Virus**].—*Arch. wiss. prakt. Tierheilk.* **69.** 69-73. 1 table. [5 refs.]

Swine fever virus was adsorbed from infected blood and brain material on to aluminium hydroxide in an acid medium of pH 5. Virus could be precipitated at the same time as protein molecules at the iso-electric point of the protein, but the supernatant fluid still retained some virulence. Adsorbed virus could be eluted by sodium hydrogen phosphate or glycocol solution. There was no weakening of virulence following the adsorption of virus.—E. J. Pullinger.

Paulsen, P. (1934). Die Beziehungen der bakteriellen Sekundärerreger zum Virus der Ferkelgrippe und Differenzierung der bei Ferkelgrippe vorkommenden Streptokokken. [**Bacterial Secondary Invaders in Swine Influenza**]. —*Inaug. Diss. Berlin.* pp. 26. 5 tables. [14 refs.]

Influenza of piglets is due to a virus, as has been shown by several workers, but secondary bacterial invaders play an important part in the production of the characteristic catarrhal broncho-pneumonia. The author infected piglets with virus and *Haemophilus influenzae suis* (*B. influenzae suis*), with virus and streptococci, and with virus and *B. cohaerens* (*Bact. bipolaris*). He comes to the following conclusions :– (1) the experimental transmission of piglet influenza is not brought about by a mixture of virus and *H. influenzae suis* ; (2) virus and streptococci from cases of the disease did not produce the characteristic pathological changes ; (3) virus and bipolar organisms administered intranasally did not cause the pneumonic changes of piglet influenza ; (4) the streptococci in the respiratory tract of affected piglets do not differ from those in healthy piglets and adults, and (5) apparently there is, therefore, a third agent, found in the unfiltered exudate, which plays its part in the production of piglet influenza pneumonia.—A. W. N. P.

Remlinger, P., & Bailly, J. (1935). Contribution à l'étude du virus de la maladie d'Aujeszky. [**Experiments on the Virus of Aujeszky's Disease**].—*Ann. Inst. Pasteur.* **54.** 149-184. 1 table. [6 refs.] [For abst. of previous articles of this series see this *Bull.* **4.** 731].

A series of experiments in the rabbit have shown that the virus of Aujeszky's disease [infectious bulbar paralysis, pseudorabies, mad itch] was present in the blood stream before becoming localized to the central nervous system, the former being virulent at the 25th hour after inoculation whereas the latter was not infective before the 46th hour. This phenomenon was much less marked in the fowl and cat, while in the dog, rat, guinea pig and hedgehog the blood always failed to infect. It is postulated that in these animals this failure was due to the extremely fleeting stage of blood stream invasion. When the blood was infective the virus appeared to reside within the erythrocytes while the leucocytes and serum were inactive. The virus did not travel from the point of inoculation to the central nervous system by the peripheral nerves, as is the case in rabies, but by way of the vessels (blood and lymphatic) ; moreover, death sometimes supervened at a time when the blood was virulent, but before the virus had reached the brain or cord.

In contradistinction to rabies, the virus was recovered from all parts of the body. This virulence of the organs seemed to be independent of their blood content since a well-washed lung emulsion from an exsanguinated rabbit was still virulent. On the other hand, the virus was not recovered from the saliva, bile, faeces or urine. Infected brain, dried over caustic potash, remained fully virulent up to the 193rd day and then became suddenly avirulent. Further experiments

indicated that emulsions diluted 1 : 500,000 were still infective, that virulence was lost after exposure to ether for 142 hours and that inactivation occurred by heating to 60°C. for 50 minutes. The action of glycerin, filtrability of virus and diffusion into normal tissues are also described in detail.—R. E. Glover.

Rossi, & Colin. (1934). La maladie d'Aujeszky paraît exister en France. **[The Existence of Aujeszky's Disease in France].**—*Bull. Soc. Sci. vét. Lyon.* **37.** 292-298. [1 ref.]

Rossi, & Colin. (1935). La maladie d'Aujeszky existe réellement en France. **[The Existence of Aujeszky's Disease in France].**—*Bull. Acad. vét. Fr.* **8.** 82-87. [1 ref.]

A case of Aujeszky's disease [infectious bulbar paralysis, pseudorabies, mad itch] is reported by the authors from France. A bovine showing all the classical symptoms of the condition (pruritis, paralysis, etc.) died after an illness of about 48 hours. The brain was inoculated into a series of laboratory animals. In this way the virus was propagated to the fourth passage, transmission being secured in several species, viz. rabbits, guinea pigs, rats and mice. The original tissue, after conservation in glycerin, was still active after 64 days at room temperature.

The origin of this case was obscure, but the owner reported the loss of two cats " with peculiar symptoms " a few months previously.—R. E. Glover.

Remlinger, P., & Bailly, J. (1935). La souche française du virus de la maladie d'Aujeszky. **[The French Strain of the Virus of Aujeszky's Disease].**—*Bull. Acad. vét. Fr.* **8.** 178-181. [1 ref.]

The existence of Aujeszky's disease [infectious bulbar paralysis, pseudorabies, mad itch] in France has already been noted by Rossi and Colin [see above]. An exhaustive experimental study of this strain by Remlinger and Bailly, in which the virus was transmitted to the rabbit, cat, dog and guinea pig, has convinced them that it is identical with the classical virus of Aujeszky.—R. E. Glover.

Regenos, S. H. (1935). **Canine Distemper and its Control.**—*J. Amer. vet. med. Ass.* **86.** 84-95.

This article deals with distemper under the headings of aetiology, symptoms, course and diagnosis, lesions, control, biological products and prophylaxis.

Under aetiology, *Brucella bronchiseptica,* streptococci, *Salmonella paratyphi* B, *S. enteritidis* and staphylococci are given as secondary invaders to the virus, and deficiency in the diet of vitamins A and D and of mineral elements as important predisposing causes.

In diagnosis, the blood picture is given some value. Normal physiological data are set out and certain changes are considered fairly characteristic.

Under biological products, the uses of serum (concentrated and unconcentrated), tissue vaccine, virogen and virus are considered. Virogen is a product containing tissue vaccine and bacterial antigens, and has the advantage of immunizing against the bacterial infections.

It is the author's opinion that the serum-virus method will supercede all others.—W. J. Ironside.

Guardabassi, M. (1935). Sur la structure des corps de Negri dans les photomicrographies à l'infrarouge. **[The Structure of Negri Bodies in Infra-Red Photomicrographs].**—*C. R. Soc. Biol. Paris.* **118.** 559-561. 5 figs. [6 refs.]

The morphological structure of Negri bodies can be clearly followed in suitable infra-red photomicrographs in which the inclusions are seen as opaque bluish-green structures in a more lightly coloured cytoplasm. The smallest bodies have the appearance of a peripheral ring of granules surrounding a clear homogeneous zone which may contain a few granules. In larger Negri bodies, the granules tend to coalesce to form a definite capsule.

It is suggested that the structure of the inclusions, as revealed by these photographs, gives a clear indication that the granules represent a stage in the evolution of a micro-organism, and does not support the view that Negri bodies are reaction products of the cell protoplasm.

[The photographs accompanying this article do not illustrate these points with complete clearness].—R. E. Glover.

Borrel, A. (1935). Clavelée péritonéale. Epiploon étudié par décalcomanie. [**Experimental Sheep Pox. Histological Examination of the Omentum**]. —*C. R. Soc. Biol. Paris.* **118.** 956-958. 1 plate.

The intraperitoneal inoculation of very young lambs with a bacteria-free emulsion of sheep pox virus gives rise to an intense reaction of the omentum, mesentery and parietal peritoneum. The method may be used for the preparation of large amounts of sheep pox virus.

In addition, the cellular reaction can be followed in the omental tissues. A thin sheet of omentum is attached to a large glass plate, fixed and stained by a Romanowsky method and then detached leaving a mass of well isolated cells on the plate. These contain numerous acidophilic inclusion bodies comparable to Guarnieri bodies which are seen not only in the endothelial cells, but also in the mononuclear leucocytes. Further, it can be shown that the inclusions correspond with collections of elementary bodies similar to those which are found in vaccinia, fowl pox, etc.—R. E. Glover.

Pegreffi, G. (1934). Dermatite pustuleuse mammaire des brebis et des chèvres. [**Mammary Pustular Dermatitis in Ewes and Goats**].—*Boll. Sez. ital. Soc. int. Microbiol.* **6.** 275-279. [In French].

This is a contagious and infectious condition characterized by the formation of pustules and scabs on the teats and mammae of ewes and goats. It is of some economic importance in that there is considerable reduction in the milk yield of affected animals. General symptoms are not in evidence except in cases where mastitis has developed. The author has shown that the condition is caused by a staphylococcus. Scabs which were dried for 30 days and filtrates prepared from scabs were non-infective on inoculation by scarification, whereas scabs and cultures of the staphylococcus were capable of reproducing a condition similar to the natural disease. Autogenous vaccines are used with success in preventing the spread of the disease.—D. R. Wilson.

Mélanidi, C., Tzortzaki, N., & Iliaki, C. (1935). Sur la virulence du sang, du cerveau et du lait dans la variole caprine expérimentale. [**The Virulence of the Blood, Brain and Milk in Experimental Goat Pox**].—*C. R. Soc. Biol. Paris.* **118.** 309-312. [5 refs.]

Samples of blood were collected from two goats, infected by the subcutaneous inoculation of goat pox virus, on the 13th and 15th days: both proved to be virulent. The virus was also recovered from the brain in two instances, but it is suggested that the infectivity of nervous tissue was dependent upon the presence of small amounts of blood, since a well-washed emulsion of brain from an exsan-

guinated goat was completely avirulent. The passage of the virus to the mammary gland after subcutaneous inoculation was demonstrated.—R. E. Glover.

Plotz, H. (1935). Un moyen simple pour déceler la présence du virus de la peste aviaire dans les cultures, sans avoir recours à l'inoculation aux animaux. [**A Simple Method for the Demonstration of Fowl Plague Virus in Cultures**].—*C. R. Soc. Biol. Paris.* **118.** 1400-1401. [3 refs.]

In reporting this method the author points out that it is not intended to replace animal inoculation but is, nevertheless, a useful means of demonstrating the presence of virus in culture. The technique is described in detail. The author has previously shown that the virus of fowl plague kills embryonic cells in three days and this fact is made use of in the test, as he has demonstrated that such killed cells do not reduce methylene blue when added to it and kept at the laboratory temperature under anaerobic conditions and exposed to light.—J. E. Wilson.

Fortner, J., & Pfaffenberg, R. (1934). Ueber Psittakose. [**Psittacosis**].—*Zlb. Bakt. I.* (*Ref.*). **114.** 331-336.

Twenty-four outbreaks of psittacosis which occurred amongst families in Germany during 1934 are noted. Twelve out of 62 infected persons died. The experiences gained during these outbreaks are discussed. [This disease has already been described fully in the literature, see this *Bull.* **4.** 166, 357 and 736]. It is noteworthy that out of 35 birds (33 parakeets, 1 parrot and 1 siskin) found to be carriers of virus, 30 showed no clinical symptoms of disease.—E. J. Pullinger.

Bland, J. O. W., & Canti, R. G. (1935). **The Growth and Development of Psittacosis Virus in Tissue Cultures.**—*J. Path. Bact.* **40.** 231-241. 20 figs. on 3 plates. [9 refs.]

By means of tissue culture technique, the authors have been able to produce a film illustrating the development of psittacosis virus in embryo chick tissues. This has enabled them to correlate the appearance of the virus particles within the living cells with stained preparations of intracellular bodies and, in their judgment, has confirmed the hypothesis that there exists a developmental cycle in this disease [see also Bedson, & Bland – this *Bull.* **3.** 361].

The cultures were composed of actively growing epithelial cells or fibroblasts from chick or mice embryos. They were infected with a concentrated suspension of elementary bodies obtained by the high speed centrifugation of splenic emulsions from infected mice. The explants were mounted in a fluid medium on cover slips (Maximow's technique) and were incubated at 37°C.

In stained preparations, the cycle appears to fall into five stages. It commences with numerous extracellular elementary bodies which soon disappear giving place to comparatively large rounded structures up to 1μ in size. These in turn resolve themselves into innumerable typical elementary bodies. In living cells examined by dark ground illumination, the virus particles are seen between the 18th and 24th hours. At first they are difficult to distinguish from the granules and mitochondria forming the centrosphere, but they show obvious signs of growth. Later, the elements composing these colonies exhibit violent oscillatory movements and emit a bluish-white light which is in marked contrast to the yellow light of the other components of the cells. The existence of a membrane surrounding the inclusions is clearly shown in living preparations. [The value of the article is considerably enhanced by a series of excellent photomicrographs, which clearly illustrate these points].—R. E. Glover.

Elford, W. J., & Andrewes, C. H. (1935). **Estimation of the Size of a Fowl Tumour Virus by Filtration through Graded Membranes.**—*Brit. J. exp. Path.* **16.** 61-66. 1 fig., 2 tables. [15 refs.]

Stock filtrates were prepared by grinding Rous tumour tissue with powdered pyrex glass and suspending the tissue in equal parts of broth and Ringer's solution. This was then centrifuged, filtered through sand and pulp and through a coarse gradocol membrane of average pore diameter of 0·8 to 1μ. This stock filtrate was passed through a 0·4μ membrane, after which process the resultant filtrate was found to have a potency of less than 10 per cent. of the stock filtrate.

The membranes are apt to become blocked with sticky material. Filtrates obtained after adsorption with alumina, kieselguhr and other agents, were not found sufficiently potent. By washing away the sticky material with broth and Ringer's solution through a membrane sufficiently small to hold back the virus and concentrating the final product, a good titre of virus was obtained, though the washing apparently diminished its potency.

This now purified virus was passed through membranes of various sizes. An active filtrate was not obtained when the washed virus was passed through a membrane of average pore diameter less than 0·25μ.

From these results, the size of the fowl tumour virus is deduced to be 0·1 to 0·15μ.—A. Brownlee.

INVERTEBRATE VECTORS OF DISEASE.

Jack, R. W. (1935). **The Control of Tsetse Fly in Southern Rhodesia.**—*Rhod. agric. J.* **32.** 237-261.

This article describes the problems of tsetse fly control in Southern Rhodesia, where the main dangers have been the spread of *Glossina morsitans* from the north, and a spread of *G. pallidipes* from the east. The former has been met by the destruction of game in areas of tsetse encroachment, and by the establishment in 1930 of a complete game reduction cordon round the whole fly area ; this has been effective in preventing any serious advance. As *G. pallidipes* was found not to follow man, and to be more shade-loving than *G. morsitans*, the eastern problem was dealt with by a narrow clearing along 30 odd miles of the Rhodesian border with Portuguese territory. The main difficulty in this area is thought to be the maintenance of this clearing.

The policy of game destruction is defended and the other possible methods of control are discussed. Total removal of forest is thought to be impracticable as it is expensive and maintenance would be difficult in view of the infertile nature of the country. Controlled grass burning has been tried for two years in one area with very discouraging results. The clearing of undergrowth is thought to offer some possibilities of success and to be a question which might repay detailed investigations. Thicket production by the prevention of grass fires is not thought to be practicable in most areas owing to the nature of the country ; European settlement would not be effective unless combined with game destruction ; biological methods are not regarded as very promising ; traps have proved ineffective for *G. morsitans*, and in Rhodesia even those for *G. pallidipes* have not given the results claimed for them in Zululand.—U. F. Richardson.

Pavlovskiĭ, E. N., & Pomerantzev, B. I. (1934). **Ticks of Domestic Animals in Eastern Armenia.**—*Trud. Sov. Izuch. proizv. Sil, Ser. Zakavkaz.* Pt. 2. pp. 49-62. 5 figs. [2 refs.] [In Russian : abst. from abst. in *Rev. appl. Ent.* **23.** 1-2].

Rhipicephalus bursa was found to be a common parasite of sheep whilst on their winter pasture but not on the summer pastures. The tick transmits piroplasmosis to sheep, cattle and horses. In addition, three species of *Hyalomma*, three of *Haemaphysalis* and one of *Dermacentor* were identified.—J. E.

RASTÉGAIEFF, A. F. (1935). Un nouveau vecteur dans la transmission des hémoparasites des animaux domestiques, *Ornithodorus lahorensis*, Neuman, 1908. [*O. lahorensis*, **Neuman, 1908, as a New Vector of Blood Parasites of Domestic Animals**].—*Ann. Inst. Pasteur.* **54.** 250-258. [11 refs.]

A disease of sheep in Transcaucasia is ascribed by the peasants to infestation with ticks which occur in the sheep folds used for the winter housing of the flocks. It is said that the disease only occurs in old folds and that if the folds are under two years old the sheep are not attacked. The ticks attack the spinal region and the dorsal part of the tail. Specimens of these ticks sent to Leningrad proved to be *O. lahorensis*. From the beginning of February till April the ticks were kept fasting at a temperature of 15° to 17°C.

The article records that two adults and two nymphs were allowed to engorge on a young goat on April 11th, and that the goat showed symptoms of disease on April 12th and died on May 25th. [It appears probable that the ticks were first allowed to feed on the goat on April 5th]. During the course of the disease the goat exhibited an anaplasma infection of the blood and also infection with a ring form of organism which was associated with Koch's bodies detected in the bone-marrow after death. Autopsy revealed enlargement of the liver and spleen, swelling of the small intestine, and small haemorrhages in the rectum and bladder.

The author concludes that *O. lahorensis* is capable of acting as the vector of *Anaplasma ovis*, and either *Theileria recondita* or *Th. ovis*.—U. F. RICHARDSON.

DISEASES CAUSED BY METAZOAN PARASITES.

TAYLOR, E. L. (1935). **The Veterinary Aspect of Parasitology.**—*Vet. Rec.* **15.** 103-114. [15 refs.]

In this paper the author gives a brief review of present knowledge of that part of the study of the metazoan parasites of domestic animals which is the particular concern of the veterinarian. He compares the development of parasitology with that of bacteriology and concludes that more concentration of effort in the causation of disease by parasites and less insistence on the study of the parasites themselves would be helpful in directing research along the most advantageous channels. Examples are given showing the urgent requirement for more knowledge on pathology, immunology and epidemiology of parasitic diseases, the pathogenicity of parasites and the effect of nutrition on parasitic disease. From the medical point of view all investigation into parasitic conditions is carried out to the end that clinical parasitology may be the more perfect and the control of disease in the living animal be better understood. It is considered that this work may best be expedited by focussing the attention on " disease " rather than on the " parasite ", i.e. the medical view-point rather than the biological one.

—E. L. TAYLOR.

TYZZER, E. E. (1935). **Viewpoints and Orientation in Parasitology.**—*J. Parasit.* **21.** 1-9.

In this very worthy addition to the many interesting addresses of the Retiring Presidents of the American Society of Parasitologists, Tyzzer makes some stimu-

lating observations on the position and progress of the science of parasitology. The experimental method of investigation is regarded as the principal means to progress, but it should be supplemented by histological study and the observation of natural occurrences of the disease which may be under investigation. He states that the application of mathematics to biological work is rather difficult to evaluate. He points out that the reliability of data is quite as important as the manner in which they are marshalled ; the precision of a method furnishes no guarantee of its fitness, and the satisfaction derived from the mathematical method tends to supplant any curiosity as to underlying causes. Even if statistical studies in biological work do not undermine the search for facts in so far as they seldom prove anything that is not already quite obvious without them, they subsequently lead to the neglect of material evidence and to separation from reality.

Some very pertinent remarks are made on bad influences at work in scientific publications and amusing references to what is called the " social standing of parasitology ".—E. L. Taylor.

Joyeux, C., & Baer, J. G. (1934). Les hôtes d'attente dans le cycle évolutif des helminthes. [**" Waiting Hosts " in the Developmental Cycle of Helminths**]. —*Biol. méd.* **24.** No. 9. 1-25. 6 figs. [28 refs.]

The authors here bring together an interesting collection of facts concerning the life-histories of nematodes, cestodes, trematodes and acanthocephalids, exemplifying the use which these parasites often make of a third host occurring between the intermediate host and the definitive host ; to this third host the authors give the name " waiting host ". The waiting host often serves only to collect larvae which are already sufficiently mature to take up their existence in the definitive host, but in other instances the larva which is not yet sufficiently mature passes through a slight change, which renders it infective for the final host. The waiting host usually plays an important part in collecting larvae to ensure the continuation of the species by bringing about a reasonably heavy infection of the final host, but many of them re-encapsulate in creatures which are not eaten by the definitive host and so never attain maturity. In studying the life-history of parasitic worms, and encountering accidental larval forms in hosts which would not acquire them in the normal course of events, it is unsafe to assume that the intermediate host has been found. —E. L. Taylor.

Dowgiallo, J. (1934). Pasorzyty przewodu pokarmowego a wpl w ich na cialka kwasochlonne krwi u koni mlodych. [**Influence of Intestinal Parasites on the Eosinophiles in Foals**].—*Wiad. weteryn.* **13.** 618-630. 8 tables. [27 refs.] [Abst. from French summary.]

Parasites are found in the alimentary canals of a large number of young horses (95 per cent. of animals examined) ; 87 per cent. have strongyles and 49 per cent. *Ascaris megalocephala*. The percentage of eosinophiles in the blood of animals without parasites is 2·6, but in infested colts it is 6. The increased percentage of eosinophile cells is an important auxiliary step in diagnosis, but it is not definitely characteristic of worm infestation.—A. W. N. Pillers.

Ono, S. (1935). **Studies on the Trematodes, Invading *Lymnaea* Snails as the First Intermediate Hosts found in the Vicinity of Mukden. I. On the Structure of their Cercariae, Effects of their Infestation on the Host Snails, as well as the Cyst-Formation of Stylet-Cercariae by the Action of the Mammalian Blood Serum.**—*J. Jap. Soc. vet. Sci.* **14.** 24-38. 19 figs. on 4 plates. [8 refs.] [Abst. from English summary].

Species of *Limnaea* are very plentiful in the vicinity of Mukden and this paper reports observations on the morphology of cercariae found in various members of that genus and on their effects upon snail hosts. *Fasciola hepatica*, *Echinostomum revoltum* and *Echinoparyphium recurvatum* are among the species of cercariae observed.—E. L. TAYLOR.

TENHAEFF, C., & FERWERDA, S. F. (1935). Over de localisatie van de echinicoccose in de organen van de slachtdieren. **[Localization of Echinococcus in Domestic Animals]**.—*Tijdschr. Diergeneesk.* **62.** 76-95. 4 tables. [24 refs.] [English, French and German summaries : abst. from orig.]

From records made by the authors, it was found that cysts of echinococcus appeared more often in the lungs than in the liver of ruminants ; in horses and pigs the reverse occurred. In 0·5 per cent. of cases the cysts appeared in the cardiac muscle of cattle. The authors prove that lung localization of echinococcus is brought about *via* the lymph vessels. As the lymphatic system of the intestines in ruminants is more developed than in horses and pigs, they assume that there is a greater opportunity for transport of oncospheres by the lymphatics to the lungs.

The authors consider that, for the study of contagious diseases in animals, it is desirable that there should be more uniformity in the statistics of meat control in different countries.—J. VAN DER HOEDEN (UTRECHT).

WRIGHT, W. H., & BOZICEVICH, J. (1934). **The Occurrence of** *Taenia ovis* **in Dogs at Washington D.C.**—*Proc. helminth. Soc. Wash.* **1.** 7.

Among the several Washington dogs examined in the previous two years, two were found to carry an infection of *T. ovis*. This parasite had been formerly found in lambs close to Washington [(1933). *J. Parasit.* **19.** 251.] and it therefore appears not to be confined to the Rocky Mountain and Pacific Coast as had previously been thought.—E. L. TAYLOR.

MUELLER, J. F. (1935). **A** *Diphyllobothrium* **from Cats and Dogs in the Syracuse Region.**—*J. Parasit.* **21.** 114-121. 1 text fig., 20 figs. on 2 plates. [10 refs.]

Three cats from the vicinity of Syracuse were found to be harbouring a species of *Diphyllobothrium* which does not appear to correspond with any of those already described. It belongs to the sub-genus *Spirometra* and is most nearly related to *D. mansoni* from which it differs, however, in several minor points, the principal one apparently being the two large terminal loops in the uterus as compared with three or four and a half in *D. mansoni*. The name given to the new species is *D. mansonoides*.—E. L. TAYLOR.

SOLOMON, S. G. (1934). **Some Points in the Early Development of** *Cysticercus pisiformis* **(Block 1780).**—*J. Helminth.* **12.** 197-204. 10 figs., 1 plate. [4 refs.]

These experiments were undertaken with the object of checking the " division " of the cysticercus which was described by MONIEZ in 1880. Ten experimental rabbits were killed at varying periods after receiving segments of *C. pisiformis*, and search was made for the larval stages by dissection and also by the microscopic examination of sections of the liver and other parts. No evidence was found, however, of any division of the cysticerci, and it was concluded that the observation of MONIEZ was either erroneous or pertained to an abnormal occurrence. The young larvae were observed to wander through the liver, leaving behind in the track sinuous white galleries with fibrous walls, and to begin to migrate into the

body cavity at the end of the second week, when they had attained a length of 3 to 6 mm.—E. L. Taylor.

Wetzel, R. (1935). Die Entwicklung der Geflügelbandwürmer und ihre Bekämpfung. **[The Development of Tapeworms of Poultry and their Control].**—*Dtsch. tierärztl. Wschr.* **43.** 188-191. 4 figs. [10 refs.]

Wetzel gives an account of the life-history, epidemiology and control of *Davainea proglottina*, and notes on *Raillietina cesticillus*, *R. bonini* and *Choanotaenia infundibulum*, most of which refers to his own work. These species are very prevalent in Germany as also are *Amoebotaenia cuneata* and *Hymenolepis carioca*, and are on the increase as a result of the more intensive keeping of poultry. *D. proglottina* infestation is at its worst from September to December, young snails then being most plentiful and having had time to become infected. Repeated applications of kainit and copper sulphate are advised, and surrounding the poultry runs with boards or strips of metal sheeting 20 to 30 cm. high, the lower edge being buried in the earth and the outer side smeared with a mixture of wagon grease and rancid fat. *R. cesticillus* is the most common tapeworm of poultry in Germany. Its larval stage is passed in ground beetles belonging to 13 different species. Unlike *D. proglottina* it is particularly prevalent on dry ground, where the beetles are most plentiful. The most important epidemiological factor in this instance is thought to be the young beetles in which the infection is carried through the winter months. Notes on the other species are very brief.—E. L. Taylor.

Kennedy, A. H., & Law, R. G. (1935). **The Differential Blood Changes in Ascariasis in Foxes.**—*Canad. J. Res.* **12.** 277-285. 10 figs. [1 ref.]

Eight fox cubs, 10 to 12 weeks old, which were known to have been free from ascaris infection for one month previously, were given doses of 500, 1,000 or 2,000 embryonated eggs of *Toxascaris canis*. Blood samples were then taken at intervals ranging from three to 13 days. Comparisons made with the two controls which were also examined and with the standard for the normal blood of foxes, previously established by Kennedy, showed that the proportion of basophiles rose to a marked degree after the administration of the embryonated eggs, in some cases reaching as high as 69·5 per cent. of the total leucocyte count. The relative increase appeared to be proportionate to the dose of eggs which was given. A marked relation was observed between the proportions of lymphocytes and neutrophiles, which tended to fluctuate in opposite directions, but the red cell count and haemoglobin remained within normal limits throughout the experiment.—E. L. Taylor.

Alicata, J. E. (1934). **Life History of *Metastrongylus salmi* and Remarks on the Eggs of the Swine Lungworms.**—*Proc. helminth. Soc. Wash.* **1.** 12-13.

It was experimentally determined that the larvae of this species, as is already known for the other species of lungworm of the pig, develop to the third larval stage in earthworms. The eggs normally appearing in the faeces possess a thick shell with a roughened uneven surface (differing from those dissected from the worms, which have only a thin shell). A naturally infected seven-month-old pig was observed over a period of ten days to pass between 1,200 and 10,000 eggs per g. of faeces.—E. L. Taylor.

Hanson, K. B., & McBlain, W. G., Jr. (1935). **Use of Elevated Wire Floors in Controlling Lungworm Infestation in Foxes.**—*J. Amer. vet. med. Ass.* **86.** 463-473. 2 figs., 4 tables. [1 ref.]

Controlled experiments were carried out on the efficiency of rearing fox cubs

on wire netting floors for the control of lungworms. The inside dimensions of the experimental pens were 16 × 6 × 6 feet, and the netting used for the floors was 1 inch hexagonal mesh galvanized steel wire No. 16. Three vixens, known to be good mothers and not likely to injure their young because of the unnatural surroundings were placed in these pens soon after mating. They produced 13 cubs and comparisons were made between these cubs and 23 others reared in the regular breeding pens, note being taken of their general condition and an estimation made of the general extent of the infestations with lungworms by frequent passage of the tracheal brush. As a result of 38 treatments 1,211 lungworms were removed from the controls, but in the same number of treatments none could be removed from those reared on the wire floors. Some heavily infected cubs were placed along with worm-free cubs in the wire-floored cages, but no evidence could be found of the transference of the infection.

Later observations showed that *Uncinaria stenocephala* and *Capillaria plica* are also controlled, and it is considered that this method will prove of considerable value on fox farms which are seriously troubled with lungworms.—E. L. Taylor.

Andrews, J. S. (1934). *Trichostrongylus longispicularis* **Collected from Cattle in the United States.**—*Proc. helminth. Soc. Wash.* **1.** 13. 1 fig.

T. longispicularis was first recognized in Australian sheep in 1933 and Andrews reports the finding of three male trichostrongyles in the fourth stomach of cattle from Louisiana, which appear to be referable to this species. A list of the measurements of the various parts of his specimens is given and comparison made with those given for *T. longispicularis*.—E. L. Taylor.

Cianciotta, A. (1934). Reperti parassitologici negli ovini pugliesi. [*Muellerius capillaris* **and** *Dicrocoelium dendriticum* **in a Sheep**].—*Pathologica.* **26.** 213-214. [Abst. from English summary].

A report of the finding in one ram in the province of Puglia, Italy, of *M. capillaris* in the lungs, and *D. dendriticum* and a ciliate of the genus *Colpidium* in the liver.—J. E.

Cuvillier, E. (1934). **Notes on the Life History of** *Cheilospirura hamulosa*, **the Chicken Gizzard Worm.**—*Proc. helminth. Soc. Wash.* **1.** 14-15.

One turkey and one chicken were successfully infected with this parasite by the feeding of larvae taken from experimentally infected grasshoppers of the species *Paroxya clavuliger*. Two other chickens which had received the larvae showed typical lesions in the gizzard, but no worms. Previous experimental feeding of similarly developed larvae had given negative results [(1933). *J. Parasit.* **19.** 244].—E. L. Taylor.

Faure, L. (1935). Dermatorragie parasitaire des bovins Nord-Africains due à *Setaria haemorrhagica*. [**"Blood Boils" caused by** *Setaria haemorrhagica* **in Cattle in North Africa**].—*Ann. Parasit. hum. comp.* **13.** 113-115.

The author has seen several cases of " blood boils " in cattle in Tunis, similar to the " blood boils " caused by *S. haemorrhagica* [*Parafilaria multipapillosa*] in horses. The worms could quite easily be recovered from the oedematous foci under the skin and proved to belong to the species which infect horses. The " blood boils " are less salient in the bovine host and a smaller amount of blood flows than is usually seen in horses. Little or no importance is attached to the condition by the owners of the animals.—E. L. Taylor.

Lukasiak, J., & Strankowski, M. (1934). Kilka rzadkich przypadków *Dioctophyme renale* (Goeze 1782) in organizmie psa. [**Case Records of *Dioctophyme renale* (Goeze 1782) in the Abdominal Cavity of a Dog**].—*Wiad. weteryn.* **14.** 7-19. 7 figs., 2 tables. [4 refs.] [Abst. from French summary].

This paper gives an account of the occurrence and distribution of *D. renale* in Poland : out of 392 dogs examined in 1931, nine (2·3 per cent.) were found to be infected. A detailed account is given of observations on six of these cases. Evidence was seen of the worms inhabiting the liver, the abdominal cavity and the kidney ; ruptures were observed in the liver, in the mesenteries and in the kidney capsule. In one instance capsules were found in the liver containing non-segmented eggs of *D. renale*, but the worm, a female 58 cm. long, was found in the kidney, thus suggesting that it had first been situated in the liver and later passed into the kidney.—E. L. Taylor.

Michailoff, W. W. (1935). Ueber Arterienfilariosis bei Rindern im städtischen Schlachthaus zu Schanghai. [**Arterial Filariasis in Cattle at the Shanghai Abattoir**].—*Z. InfektKr. Haustiere.* **47.** 215-220.

Nodular swellings were observed in the walls of the aortas of cattle, both in the mediastinal region and where the aorta leaves the heart. Some had become calcified, some showed a tendency to abscess formation, and others appeared markedly haemorrhagic. The nodules were actually observed in 85·2 per cent. of 2,821 adult cattle, and in 29·26 per cent. of 735 calves. Each nodule was found to contain a female filarial worm, so wound about in the connective tissue fibres, however, that the author was unable to extract a complete specimen. The examination of such portions as he was able to secure showed the worm to be referable to the sub-family Onchocercinae. A short description is given of the fragments which were recovered but no name is given to the worm.—E. L. Taylor.

Parnell, I. W. (1935). **On the Control of Free-living Larvae of Bursate Nematodes of Domestic Animals.**—*Trop. Agriculture, Trin.* **12.** 111-113.

It has been shown that one of the best ways of killing the infective larvae of parasitic nematodes in manure is to saturate it with urine. Although this may be done quite successfully in a compact manure heap, two, three, or more applications may be necessary and the best method is to have two concreted pits 9 feet wide and 5 feet deep so that one can be filled while the other is being emptied. Artificial manures are not a very good substitute for urine as the presence of faeces greatly reduces the lethal action which some of them otherwise have.

Frequent harrowing appears to be one of the best ways of keeping down the amount of infective material on pastures as the faeces dry quickly when scattered about and the pre-infective larvae perish.

The use of steam under pressure was tried for the destruction of larvae in stables, but it was found that quite a small amount of faeces provided adequate protection to the larvae for several seconds.—E. L. Taylor.

Schwartz, B. (1934). **Controlling Kidney Worms in Swine in the Southern States.**—*Leafl. U.S. Dep. Agric.* No. 108. pp. 6. 4 figs.

This leaflet gives an account of the life-history of the kidney worm and a method of pig management devised for its control. It is based upon the observation that the eggs and larvae of *Stephanurus dentatus* soon perish when exposed to dryness and to strong sunlight, and concerns itself chiefly with the prevention of the infection of young pigs while they are with the sows. Sows with litters are placed in fields in which suitable forage crops have been sown and a bare strip is main-

tained free from vegetation five feet wide round the sides and 30 feet wide at one end. Sows and young pigs are fed in separate places on the wide bare strip and the whole arrangement tends to encourage the young pigs to feed on ground which is not contaminated by the infected sows.—E. L. Taylor.

IMMUNITY.

Marrack, J. R. (1934). **The Chemistry of Antigens and Antibodies.**—*Spec. Rep. Ser. med. Res. Coun., Lond.* No. 194. pp. 132. 26 figs., 25 tables. [147 refs.] [2s. 6d.]

This report deals essentially with the recent chemical and physical studies which have done much towards clarifying our knowledge of the nature of the antigen-antibody reaction and which have helped us to unravel slightly the complicated subject of immunological specificity, especially in its relationship to chemical composition and structure. A very useful first chapter gives a short review of the physical and chemical aspects of those materials and processes involved in immunity reactions. In succeeding chapters the nature of antibodies, the specificity of antigens and the nature of antigen-antibody reaction are all dealt with in detail from the chemical point of view.

Marrack has produced a monograph which everybody interested in immunology would be well advised to study since he has succeeded in condensing into 132 pages all the recent advances in chemical theory which it is imperative for the immunologist to know before he can become familiar with the processes involved in the mechanism of immunological reaction in its relation to infection.—J. S.

Douglas, S. R., & Hartley, P. (1934). **The Preparation of Old Tuberculin by the Use of Synthetic Media, with Observations on its Properties and Stability.**—*Tubercle, Lond.* **16.** 105-113. 2 tables. [10 refs.]

Old tuberculin, prepared in a modified Long's synthetic medium and tested intracutaneously in guinea pigs, possessed a potency two or three times that of the International Standard Tuberculin. Experiments on keeping qualities showed that certain samples deteriorated very rapidly. This loss was apparently due to the extremely low glycerol content of the product, the glycerol being utilized in the process of growth. The drop in potency was not attributable, however, to the lack of glycerol as such, but to the growth under these conditions of a tuberculin-destroying mould. By adding sufficient glycerol to bring the content to 50 per cent., these tuberculins remained sterile and were then not less stable than the International Standard.

Dilutions of synthetic and old tuberculin were comparatively stable since, after prolonged heating at high temperatures, not less than one-half the original activity remained (time did not permit experiments on the effect of prolonged storage). The use of a boric-borate-buffer as a diluent is recommended.—R. E. G.

Buxton, J. B. (1935). **Some Aspects of the Role of Tuberculin in the Control of Tuberculosis.**—*Proc. R. Soc. Med.* **28.** 257-264. [21 refs.]

The main part of this paper comprises a general survey of the present position regarding the intradermal tuberculin test in cattle. In the opening remarks, the drawbacks of the subcutaneous test are discussed, with particular regard to desensitization following unintentional " doping " in the form of intensive testing. It is suggested that this test cannot be regarded as satisfactory for cattle.

The differences in the tuberculin sensitiveness of cattle as compared with man and other animals are then noted, the need for highly potent tuberculins being

stressed. Old tuberculin is perfectly satisfactory in positive cattle, but some difficulty may arise in negative animals owing to the occasional occurrence of non-specific reactions having the attributes of specific reactions. This drawback can be overcome by the use of synthetic medium tuberculin. In this connection, the possibility of sensitization with tuberculin-protein requires consideration. Experiments are cited which tend to show that, although unheated products may induce allergic-like reactions, there is no evidence that preparations denatured by heat have the power of sensitizing the skin.

Fluctuations in the sensitivity of the skin in tuberculous cattle are then mentioned. It has been found that, in highly allergic animals, the injection of a non-specific substance, such as glycerin veal broth, may give rise to pseudo-positive reactions, but this increased sensitivity is generally restricted to an area in close proximity to a tuberculin reaction ; conversely, it can be shown that, following one intradermal test, localized areas of desensitization may be produced.—R. E. G.

Laenkholm, W. (1934). Tuberkulinprøver paa Kvaeg. [**Tuberculin Tests on Cattle (Denmark)**].—*Medlemsbl. danske Dyrlaegeforen.* **17.** 587-603. 3 tables.

This article is a paper read at a veterinary meeting. The author discusses work on tuberculin tests including that by Christiansen, Bang and Velling and the British Medical Research Council, arguing that there is evidence that the intradermal test is more reliable than the others. In 1933 the Danish government issued new regulations regarding the tuberculin tests, prescribing the intradermal test [single injection] as the only one recognized. The result must be read 72 hours after injection, and every large and tender swelling is to be regarded as a positive reaction when the avian type of tuberculosis and Johne's disease can be excluded. Further, the regulations include a scale of measurements to be used as a guide in interpreting the test, different standards being used according to the class of herd, whether clean or heavily infected, and whether the avian type of tuberculosis or Johne's disease is suspected or not. The author discusses these new regulations and states that, in his opinion, the palpation of the swelling is generally the most reliable measure for deciding a positive or negative reaction. [See also this *Bull.* **5.** 469].—Gustav Naerland (Farsund).

Stinson, O. (1935). **Clinical Signs in Intradermal Reactors. [Correspondence].** —*Vet. Rec.* **15.** 48 and 187-188. 1 table.

Tweed, W. (1935). **Clinical Signs in Intradermal Reactors. [Correspondence].** —*Ibid.* 102 and 217. 2 tables.

In a series of letters dealing with systemic reactions following the double intradermal tuberculin test in cattle, Stinson states that the test frequently induces a marked diminution in the milk supply, a rise in temperature and general signs of malaise. In response to a request from Tweed he quotes figures showing that in reactors a loss of over one gallon of milk per day over a period of from seven to ten days may be expected, while a depreciation in value of £3 is not uncommon. Tweed replies that he has obtained a rise in temperature between the first injection and the 48th hour in six reactors out of 16, while the milk yield was decreased in only one of these cases.—R. E. Glover.

Paludan-Nielsen, O., Plum, N., & Werdelin, C. (1934). Bidrag til Belysning af Vaerdien af Hagelapprøven hos Høns. [**Value of the Wattle Tuberculin Test in Fowls**].—*Maanedsskr. Dyrlaeg.* **46.** 437-442.

Thirty out of 108 hens gave a negative and 78 a positive tuberculin reaction. In 15 out of the 30 negatively reacting hens macroscopic tuberculosis was found.

Tubercle bacilli could be cultivated from three of them. It does not seem to be of actual importance whether the tuberculin is injected intradermally or subcutaneously. It is not always possible to inject as much as 0·1 c.c. of tuberculin into the wattle. The test is not reliable enough for the purpose of separating healthy from tuberculous fowls in a flock.—H. C. Bendixen (Copenhagen).

Shwartzman, G. (1935). **Grading of Local Skin Reactivity to Bacterial Filtrates.**—*J. exp. Med.* **61.** 383-393. 3 tables. [11 refs.]

The duration of the state of reactivity (Shwartzman reaction) induced by various preparations was studied. The skin of normal rabbits was prepared by single intradermal injections of *Salmonella typhi* (formerly *Bact. typhosum*) or meningococcus filtrates and the reactions to various bacterial filtrates determined after various intervals. The results demonstrated a strict parallelism between the potency of activating filtrates and the duration of the reaction, i.e. weak agents failed to stimulate reactions after 24 hours, whereas preparations of high potency elicited reactions up to 120 hours. The potency of filtrates was reduced, but not entirely eliminated, by heating to 100°C. for 20 minutes.

The reaction could also be accurately evaluated by quantitative methods. Single skin sites were prepared with various dilutions and then activated by the intravenous inoculation of five to 25 doses. The skin-preparatory potency of filtrates was not modified by a preliminary sensitization with horse serum or other animal proteins (Arthus phenomenon).—R. E. Glover.

Baker, A. B., & Wetherby, M. (1935). **Latent Tuberculous Immune Bodies in Non-Tuberculous Individuals.**—*J. infect. Dis.* **56.** 153-164. 3 tables. [39 refs.]

It has been established that an immunized animal may show an increased antibody titre when injected with a non-specific agent. The authors have noted a marked increase in the complement-fixing antibody for tuberculosis in patients receiving an intravenous course of a streptococcus vaccine. Many of these showed a positive skin reaction with " O.T." and a negative complement-fixation before treatment, but positive fixation after treatment.

The significance of this increase is discussed.—R. E. Glover.

Zuwerkalow, D., & Kutscherenko, I. (1935). Die Serum-Eiweissfraktionen bei der Hyperimmunisierung der Schweine. [**The Serum-Protein Fractions in the Hyperimmunization of Swine**].—*Arch. wiss. prakt. Tierheilk.* **69.** 61-68. 3 figs. [5 refs.]

Normal serum was found to contain 5·5 to 6·5 g. per cent. of protein matter of which more than half was globulin (including pseudoglobulin). When a pig was immunized with an antigen such as swine fever virus the first injection was followed by a sharp rise in the total protein content. This rise was the result of a rise of the globulin fraction whilst the albumin content fell slightly. Subsequent injections produced no significant change in the protein content. Heavy bleeding of the pig resulted in a marked fall in the total protein and globulin figures, whilst the albumin figure rose slightly. Subsequent reinjection with antigen was again followed by a sharp rise in the total protein and globulin figures, whilst that of the albumin fell again.—E. J. Pullinger.

Trawinski, A. (1935). Neue Diagnosemethode der Trichinose. [**New Method for the Diagnosis of Trichinosis**].—*Z. Fleisch- u. Milchhyg.* **45.** 166-168.

The author has made several trials of a precipitin test for the detection of

infection with *Trichinella spiralis* in swine. The antigen is prepared from young, unencysted trichinae extracted from rabbit muscle by digestion ; the trichinae are then dried and subsequently ground down and mixed with 500 times the amount of physiological saline. The blood of the pigs is collected at the abattoir, placed in a small vessel and kept first at 37°C., afterwards at 8°C. to obtain a good separation of the serum; the precipitin test is then carried out in a glass tube 10 cm. long and 1 mm. in diameter. Serum is drawn to about half way up the tube, then antigen is drawn up, after which the two open ends of the tube are plugged with plasticine. The tube is then placed at 37°C. for one hour and a reading taken by the aid of a hand lens magnifying about 15 diameters. Trials were made on experimentally infected pigs and positive reactions were obtained only 12 to 15 days after infection. Positive reactions were also obtained in instances where complete encapsulation had taken place. In the author's opinion, this test is the diagnostic method of the future.—E. L. Taylor.

Olitzki, L. (1935). **Quantitative Measurements of the Absorption of Agglutinins by Bacteria.**—*J. Immunol.* **28.** 123-131. 5 tables. [8 refs.]

Rabbits were inoculated with phenolized cultures of both *Proteus vulgaris* HX19 and HX2, which antigens contain both H and O fractions, and the sera obtained from the rabbits contained H and O agglutinins. These two organisms contain a common H antigen and specific O antigens, so that pure H agglutination may be obtained by agglutination of an H form in the heterologous serum, and pure O agglutination by agglutination of the O form with the homologous serum.

The methods of preparation of the antisera, the antigens for the absorption tests, the antigens for the agglutination tests and the technique of absorption and agglutination are described.

It was found that a given amount of antigen will absorb more agglutinins from a serum as the concentration of that serum increases, but that the proportion of the amount of agglutinins absorbed to the total amount available falls as the concentration increases until, in sufficiently high concentration, this relative absorption value falls to zero.

For a given amount of antigen, the difference between its maximum relative absorption value and its minimum relative absorption value is greater in the case of H agglutinins than in the case of O agglutinins. With a given amount of agglutinins, also, the difference between the antigen quantities giving the maximum and the minimum effective absorption is greater in the case of the H antigen.

There are at least five times as many H as O antigen units in antigen from the same growth of a *P. vulgaris* culture (H type).—A. Brownlee.

Viridén, P. (1934). Undersökningar över förhallandet mellan kons agglutinationsvärde ock mjölkens bacillhalt vid sjukdomen smittsam kastning hos ko. Banginfektion. [**The Blood Agglutinin Titre in Udder Infection with** *Br. abortus*].—*Skand. VetTidskr.* **24.** 711-717. 2 tables. [1 ref.] [English summary : abst. from orig.]

In this article, the author describes a series of investigations that he has undertaken on this subject, in order to prove a statement made by Tullberg (1931) that the higher the blood agglutinin titre, the more frequently may *Br. abortus* be found in the cow's milk. The author gives a detailed description of the technique used and the number of cases examined. Thus, the cows are arranged in groups according to their agglutinin titres. The results of his investigations are shown in the following table :–

Blood agglutinin titre. [1 :]	No. of cows examined.	No. of cows in which *Br. abortus* could be demonstrated in in the milk.	Percentage of cases in which *Br. abortus* could be demonstrated in the milk.
0–15	—	0	0
20–30	9	1	11
50	8	4	50
70	9	5	56
100–1,000	10	6	60

As it will be seen, these figures confirm the statement made by TULLBERG. However, in those cases with a lower agglutinin titre (1 : 30, 1 : 50, 1 : 70), the author found a higher proportion with infected milk than TULLBERG reported. As both were working with the same herd, the author suggests that this phenomenon may be a result of the fact that when he examined the herd it had been infected for a longer period of time than when examined by TULLBERG, and he assumes that the chances of the bacilli being excreted in the milk may increase in proportion to the length of time the infection has been in existence.—G. N. (FARSUND).

WELCH, H., & MARSH, H. (1935). **A Whole-Blood Field Agglutination Test for Bang's Disease in Range Cattle.**—*J. Amer. vet. med. Ass.* **86.** 493-507. 7 figs., 4 tables. [1 ref.]

In testing range cattle it is essential that the test should be rapidly carried out on the spot and that marking of cattle should be unnecessary. Any method which does not allow 200 to 300 animals to be tested per day is impracticable. The test elaborated is carried out once yearly at the time of culling for slaughter and, since a good cow of this type is worth as much for beef as for breeding, it is economically sound to reject animals showing even a low titre. The test is a modification of the rapid whole-blood test used in *Salmonella pullorum* infection ; a stained antigen is prepared by the method of Donham and Fitch, except that only one strain is used, and to the antigen is added 5 per cent. of a 3 per cent. aqueous solution of methyl violet which imparts a deep blue colour. A box is divided into ten numbered compartments fitted with glass lids to protect the blood from dust and to lengthen the interval taken for the drops to dry : a white enamelled background is provided. Underneath is a compartment for warm water to hasten agglutination in cold weather. The cattle are collected in a pen holding eight to ten animals, and retained there until the test is completed ; this takes from 40 to 50 minutes – each sample being under test for at least five minutes. Approximately 2 c.c. of blood is collected from the tail, by stockmen, into standard tubes (5 × 100 mm.) containing 0·2 c.c. of a 17 per cent. solution of sodium citrate. 0·03 c.c. of the citrated blood is mixed with 0·03 c.c. of antigen (dilution estimated to equal 1 : 50), placed on a slide and stirred with a metal rod. Reaction is noted by the formation of blue clumps. The reactors are then marked and the cattle released.

Blood samples from 181 cows, from an infected herd, were tested in the laboratory by the rapid whole-blood test and the standard serum test, which established the dependability of the former test.—H. E. BYWATER.

TERENTJEFF, F. (1934). **The Use of Saponinized Anthrax Vaccine.**—*Sovyet. Vet.* No. 11. pp. 9-11. 2 figs., 1 table. [Abst. from French summary].

The author carried out experiments with the second vaccine of Tzenkovsky (containing 54 million spores per c.c. in 5 per cent. solution of saponin) as regards its use alone on horses, cattle and sheep, and the results obtained when the concentration of saponin (Schering-Kohlbaum brand) was reduced. As a result, he came

to the following conclusions :– (1) the immunity process remains localized, thus reducing losses and complications ; (2) the inoculation hardly affects the animal or the milk yield, and the period of rest can be halved compared with the double vaccination method ; (3) the second vaccine alone gives a stable and durable immunity, and (4) it may be given in 4 per cent. saponin solution. [The lowest effective concentration has yet to be determined].—C. V. Watkins.

Delez, A. L. (1934). **Observations on the Subcutaneous Vaccination of Heifers against Bang's Disease during Calfhood.**—*J. Amer. vet. med. Ass.* **84.** 924-927. [1 ref.]

Amplifying previous work, the author records a vaccination experiment in a group of bovines during calfhood and early maturity. Primary vaccination of calves when three to four months of age, using both single and repeated subcutaneous doses of *Brucella abortus* culture, was undertaken. The calves were mated when 17 to 18 months old with a non-infected bull and a series of artificial infection experiments followed. The oral method of infection, using a virulent *Br. abortus* culture at the fifth and, in some, the fifth and eighth months of pregnancy, was adopted. Seven out of nine vaccinated heifers produced live calves, infection being confirmed in six of the nine at subsequent examination. In some cases the vaccination caused the production of agglutinins for a few months and in some it did not.—A. L. Mullen.

Kenda, I. (1935). Vergleichende Wertbemessung des Schweinerotlaufserums an Tauben und weissen Mäusen. [**Standardization of Swine Erysipelas Serum in Pigeons and White Mice**].—*Z. InfektKr. Haustiere.* **47.** 252-258. 4 tables. [10 refs.]

For standardizing swine erysipelas antiserum the immunizing power of a sample was tested against a 24-hour broth culture of *Erysipelothrix rhusiopathiae*, 0·5 c.c. of which killed a pigeon in 60 to 72 hours. The virulence of this culture was maintained during 50 subcultures. Saline dilutions of antiserum were injected into the breast muscle of a series of pigeons whilst the infecting dose was injected into the opposite side. Used in this way pigeons were found to be suitable for the standardization of antiserum, eight-month-old birds being used for the purpose. A normal antiserum was taken as one of which 0·5 c.c. would protect against 0·5 c.c. of test culture, this being equivalent to 10 Marx units. With a twice normal antiserum 0·25 c.c. would give the necessary protection. For use in the simultaneous inoculation of pigs with virus and antiserum a five-fold normal antiserum is recommended whilst a ten-fold normal sample is suitable for curative purposes.
—E. J. Pullinger.

Verboff, A. M. (1934). **Immunization against Bovine Contagious Pleuro-Pneumonia by Live Culture.**—*Sovyet. Vet.* No. 11. pp. 24-32. 6 figs., 1 table. [Abst. from French summary].

The author has successfully used prophylactic vaccination with virulent cultures against bovine pleuro-pneumonia in North Caucasus. The method of preparing cultures from the pulmonary lymph at the acute stage of the disease, or from the sequestra of lungs of various ages, as well as the pleural effusion are detailed. After considerable dilution with physiological saline or Dujardin-Beaumetz broth the material is filtered through a Chamberland filter. Broth is inoculated, and shows a growth in four to five days. Pure cultures are examined for their virulence and immunizing properties upon animals. If satisfactory, bulk cultures are made in the broth medium and, after eight days' incubation,

sealed in 10 to 20 c.c. ampoules, being then ready for use. Details of administration are not stated.—C. V. Watkins.

Zuwerkalow, D. A., & Kutscherenko, I. (1935). Serodiagnostik bei Schweinepest. Präcipitationsreaktion bei Schweinepest. [**The Precipitation Test in the Diagnosis of Swine Fever**].—*Arch. wiss. prakt. Tierheilk.* **68.** 442-451. 5 tables. [6 refs.]

Although the virus of swine fever possesses strong antigenic properties, it cannot be separated from the tissue protein of the blood or organs ; consequently, tissues from infected animals cannot be used as antigens for the preparation of precipitin serum. Recently, however, it has been shown that the virus is excreted in large quantities in the urine. To prepare an antigen from this source, urine is collected on the seventh day after infection when the symptoms have fully developed. Such urine should not be kept for more than a week and heating for one hour at 58°C. destroys the virus. The urine is dialysed cold in a collodion sac for 15 to 20 hours and the residue concentrated in a vacuum at 40°C. The material is next passed through a Seitz filter and sodium chloride added to make a 0·85 per cent. solution. If 1 c.c. of this antigen is injected into a rabbit every day for ten days, specific precipitins should be present in the serum 24 hours after the last injection. Neither normal urine with or without the addition of protein, nor urine from animals suffering from paratyphoid [necrotic enteritis ?] gives a precipitin reaction with specific swine fever serum.—J. A. Nicholson.

Geiger, W. (1935). Die Vaccination bei Virusschweinepest. [**Vaccination against Swine Fever**].—*Arch. wiss. prakt. Tierheilk.* **68.** 420-441. [12 refs.]

This is a review of the literature on vaccines against swine fever and a detailed account of trials with two vaccines – Michalka's [Austria] formol vaccine and the Czechoslovakian vaccine prepared at Ivanovice. The former was found to be too virulent and the latter insufficiently antigenic to confer immunity.

Geiger is of the opinion that we are still far from obtaining a reliable vaccine against swine fever.—J. E.

Kantorowicz, R. (1933). Experimentelle Untersuchungen über die Hundestaupe und deren Vorbeugung durch eine neue Schutzimpfung. [**Investigation with Canine Distemper and a New Preventive Inoculation**].—*Arch. wiss. prakt. Tierheilk.* **66.** 203-233. 23 figs., 2 tables.

This paper contains detailed reports of experiments on dogs, ferrets, rabbits, guinea pigs, rats and mice with the virus of dog distemper. As a result it was found that the brain contains less potent virus than other organs, and it was therefore selected as the most suitable (least dangerous) organ for the production of a vaccine, a simple untreated suspension being used.

Tests on 130 test dogs and 145 privately-owned dogs have been successful, some of the dogs resisting infection on being placed in a distemper ward at a veterinary hospital and only a very few reacting severely to inoculation. [These results can only be accepted as being of a preliminary nature].—J. E.

Kolayli, C., & Mavrides, N. (1934). Vaccination par la méthode du claveau sérumisé. [**Vaccination with Serum-treated Sheep Pox Virus**].—*Rec. Méd. vét.* **110.** 669-673.

Sensitized sheep pox virus, prepared by the method of Bridré and Boquet, affords a lasting immunity against sheep pox. In Turkey, however, the high cost of this vaccine together with the difficulty which is encountered in despatching it

to different parts of the country without loss in potency, have led the authors to investigate the value of sheep pox virus treated with serum on the spot.

They have found that the standard strain can be used for this purpose since it retains its virulence for at least 45 days. When required for use, four drops of a 1 : 10 dilution of virus are added to 5 c.c. of a potent antiserum previously heated to 56°C. The mixture is left for one and a half hours and is then inoculated intradermally in a dose of 0·25 c.c. This confers an immunity, without provoking pustule formation, which is said to last at least six months. So far 203,700 doses have been issued with favourable results.—R. E. Glover.

Gaede, H. (1935). Beitrag zur Schutzimpfung gegen Hühnerpocken. [**Vaccination against Fowl Pox**].—*Berl. tierärztl. Wschr.* **51.** 3-4.

The value of a new brand of fowl pox vaccine known as the virus-lanoline vaccine was tested on 15 fowls. Vaccination was followed by a strong reaction within six days. Ten vaccinated birds were placed in contact with four infected ones. Seven of the vaccinated birds were completely immune and two partially immune, while one developed no immunity. Five other vaccinated birds reacted more mildly than did unvaccinated ones to infection by scarification. In a comparative experiment using pigeon virus in glycerin, six birds were completely immune and four were partially immune to infection by contact.

—E. J. Pullinger.

Schermer, S., & Kaempffer, A. (1933). Weitere gruppenspezifische Differenzierungen in Pferdeblut. [**Differentiation of Blood Groups in the Horse**]. —*Z. ImmunForsch.* **80.** 146-171. 12 tables. [23 refs.]

Cross-agglutination tests with the blood of 100 horses have revealed the following antigen (blood corpuscles) and antibody components present in the blood of horses in the following percentages :- [Capital letters denote antigen, and Greek and small letters antibody]. O 1 ; A 82 ; B 84 ; AB 96 ; X 20 ; Y 17 ; Z 32 ; V 30 ; o 42 ; α 18 ; β 16 ; x 10 ; y 15 ; z 4 ; v 9.

Differences exist within the main component Aα. Subordinate to the highly sensitive A antigen there occurs a less sensitive sub-type A2 ; similarly, there is a highly sensitive antibody α and a less active one α2. If A2 antigen is mixed with α antibody in an agglutination test, very often no agglutination occurs. Of blood samples of the A group, 7·5 per cent. show the subordinate A2 antigen with α antibody. In a former publication [see this *Bull.* **3.** 42.] these cases were considered as Aα grouping and were designated as unphysiological in structure. The foregoing explanation of sub-types renders this grouping A2α as entirely physiological. The components X-x, Y-y, Z-z, and V-v are described for the first time.—E. J. Pullinger.

Guoth, G. E., Kómár, G., & Kamaras, L. (1934). Vércsoportmeghatározások lovakon és kutyákon, tekintettel a vérátömlesztésre. [**Determination of Blood Groups in Horses and Dogs with Special Reference to Transfusion**]. —*Allatorv. Lapok.* **57.** 281-287. 2 tables. [25 refs.] [Abst. from translation of Hungarian summary].

The authors deal at length with the technique of blood group testing with equine and canine blood. In their work with the former they found that 6·93 per cent. fell into group AB, 19·07 per cent. into group A, 9·24 per cent. into Group B and 13·39 per cent. into group O.

The available material was insufficient to determine blood groups of dogs.

—J. E.

DISEASES, GENERAL.

GLUSCHKE, A. (1934). Kämpf den Tierseuchen. [**Control of Animal Diseases**]. —*Angew. Chem.* **47.** 327-331.

An estimation is made of the value of livestock in Germany and of the monetary losses experienced during 1931 from infectious or contagious disease. The article contains a general discussion of the manner in which the majority of diseases of economic importance are combated, special reference being made to the subject of chemotherapy.—E. J. PULLINGER.

NUMANS, J. M. G. (1934). Besmettelijke en andere belangrijke ziekten. (Extracten uit de Verslagen der Militaire Paardenartsen, No. 6 & No. 7). [**Contagious and Other Important Diseases in Military Horses. (Abstracts from the Reports of the Army Veterinary Surgeons, Dutch East Indies)**].—*Ned.-ind. Bl. Diergeneesk.* **46.** 176-183 and 329-343. 3 tables.

During 1931 only one case each of anthrax, surra and glanders and three cases of epizootic lymphangitis [*Cryptococcus farciminosus* infection] occurred amongst the army horses in the Dutch East Indies. Only one horse was affected with tetanus ; this low incidence was certainly due to the large amounts of prophylactic serum injections given.

Several horses suffered from osteofibrosis. Determination of the phosphoric acid content of the urine is useful for diagnosis ; this method has been in use since 1913.

Since DEKKER has found a deficiency of calcium in the forage in the Dutch East Indies, 50 g. calcium phosphate is added to the food of each horse during the first four days of the week. Osteofibrosis, which occurred only among Australian horses, seems to be due to a lack of calcium, not of phosphoric acid, in the forage. Since 1926 these horses have, therefore, been receiving 50 g. of calcium carbonate per day and up to the present no cases have been recorded.

The occurrence of periodic ophthalmia has gradually decreased since 1917. In this year it was 4·6 per cent. ; in 1931, 2·6 per cent., and in 1932, 1·7 per cent. There seems to be some relationship between this disease and the keeping of horses in low and swampy regions, or the consumption of forage (hay) coming from such parts.—J. VAN DER HOEDEN (UTRECHT).

ANTHONY, D. J. (1935). **Some Notes on Swine Practice.**—*Vet. Rec.* **15.** 75-85.

One of the most important factors in the prevention of disease in swine is to have good hygienic conditions and to be sure that the diet provided has no nutritional deficiencies. A brief summary of various diseases is given, together with symptoms, and the treatment advised.

Pneumonia is one of the most common diseases and is associated with bad hygienic conditions. Reduced vitality, such as produced by pneumonia, or by a sudden change of diet, predisposes to contraction of swine erysipelas.

Under nutritional deficiencies, the most common disease is anaemia occurring in litters about three weeks old. The symptoms include diarrhoea and drowsiness. Treatment varies, but iron gives the best results if medicinal measures are employed. The best treatment is to put the sow and litter on to good pastures.

Rickets may be caused by a deficiency of lime or vitamin D, or by an incorrect calcium/phosphorus ratio. An excess of phosphorus reduces the calcium absorption, unless there is adequate vitamin D to rectify it.

The farrowing of dead piglets is usually caused by an inadequate ration being supplied to the sow during pregnancy. Iodine deficiency may be a cause.

Various surgical conditions are described together with their complications, and the methods of treatment.—N. H. Brooksbank.

Smythe, A. R. (1934). **Infectious Diseases of Cats.**—*Vet. Rec.* **14.** 1263-1264.

The author recognizes four distinct contagious diseases of cats – infectious enteritis, contagious ulcerative glossitis, cat influenza and cat distemper.

Infectious enteritis occurs as an outbreak and chiefly affects kittens, which show vomition and abdominal pain. Influenza usually manifests itself by an outbreak of sneezing in a cat kennel and cat distemper resembles influenza but is more severe. The aim of the paper was to clarify the nature of cat diseases since cat distemper and infectious enteritis are receiving attention.—J. E.

Beveridge, W. I. B. (1934). **Foot-Rot in Sheep. Skin Penetration by Strongyloides Larvae as a Predisposing Factor.**—*Aust. vet. J.* **10.** 43-51. 2 figs. [10 refs.]

Whatever the causal organism of foot-rot in sheep may be, it appears that predisposing factors play a greater part under field conditions in Australia in determining the incidence of the disease than does contagion. Information obtained in the field did not entirely support the generally held opinion that long-continued wetting of the feet is the principal predisposing cause, as the incidence of the disease did not altogether coincide with the occurrence of wet conditions. Evidence is given which shows that the greatest incidence of foot-rot coincides with conditions which would be the most favourable for heavy percutaneous infection with *Strongyloides papillosis*. The effect of application of *Strongyloides* larvae to the skin of sheep was studied and found to produce a marked skin reaction. Inflammation and pustule formation were demonstrated macroscopically and in sections. Attempts to produce foot-rot by application of *Strongyloides* larvae and infective material taken from foot-rot lesions were successful on six out of eight feet treated. Five feet to which the infective material was applied without larvae did not develop the disease. Various possible predisposing causes of foot-rot are discussed, and an outbreak is recorded where grass seed (*Hordeum murinum*) appeared to have provided a portal of entry for the causal organism. It is suggested that percutaneous infection with larvae of *S. papillosis* may be a common predisposing cause of foot-rot in the field. It is also suggested that the demonstration of the production of skin lesions by these larvae shows that they may provide a portal of entry for bacteria causing other diseases.—W. I. B. Beveridge.

Lewis, Margaret R., & Mueller, Elizabeth. (1934). **Studies on the Common Cold in Chickens.**—*J. Amer. vet. med. Ass.* **84.** 759-769. [14 refs.]

The material used in the studies was obtained from the nasal passages and sinuses of previously healthy chicks which were artificially infected from natural cases. The disease was found to be easily transmitted by intranasal inoculation, but not by subcutaneous or intramuscular injections. The symptoms and *post-mortem* findings are detailed but no evidence of intracellular bodies was found in smears from the nasal exudate. The virulence was not altered by passage.

The viability of the causal agent under various conditions was studied and also the effect on it of buffer and soap solutions, alcohol, disinfectants and certain dyes. Filtrates were found to be incapable of setting up the disease and similar results were obtained with tissue cultures. Adsorption experiments were carried out with varying results but, as a general rule, if the solutions were bacteria-free they were incapable of causing the infection. No lasting immunity was apparent in birds which had recovered from the disease.—J. E. Wilson.

BEAUMONT, G. E., & GILL, A. M. (1935). **A Case of Cat-Bite Fever.**—*Brit. med. J.* March 23rd. 582-583. 1 table, 2 charts. [3 refs.]

A child, bitten by a stray cat, presented a syndrome characterized by successive febrile reactions lasting six weeks, muscular swellings and conjunctivitis. The case was regarded as one of cat-bite fever (believed to be identical with rat-bite fever), although the spirillum was not recovered from blood samples injected into both guinea pigs and mice. The intravenous inoculation of novarsenobenzol appeared to exert a beneficial effect.—R. E. GLOVER.

JEFFCOATE, T. N. A. (1935). **Sterility due to Ovarian Dysfunction.**—*Brit. med. J.* Feb. 23rd. 345-350. 2 figs., 1 table. [16 refs.]

In cases of sterility due to ovarian dysfunction, it is always an anterior pituitary hormone which is lacking and the administration of oestrin or progestin may be followed by definitely harmful results. Treatment with anterior pituitary preparations is still unsatisfactory, as the various factors secreted by this gland have not yet been isolated. It is evident that underactivity of the thyroid gland is not directly responsible for sterility since, like the ovary, this gland is also subservient to the anterior pituitary.—J. A. NICHOLSON.

VAN LENT, C. C. (1933). Das Studium der Blutlinien als ein Beitrag zur sog. Erblichkeit des Kehlkopfpfeifens. [**The Genetical Aspect of Roaring in Horses**].—*Inaug. Diss. Bern.* pp. 63. [Abst. from abst. in *Wien. tierärztl. Mschr.* **21.** 218].

The author examined stud books of 17 families of the Belgium breed of draught horses in a search for any evidence of correlation between roaring and heredity. Material examined covered over 1,500 stallions.

Although it was difficult to obtain evidence of the hereditary transmission of roaring, the author found that in many family lines a definite or high percentage of the offspring were roarers, the highest being 59 per cent. in the Roland strain of this breed.

The abstractor of this dissertation, Prof. KELLER of Vienna Veterinary College, describes this work as being a very valuable contribution to the science of applied genetics [see also BUCHANAN SMITH (1930). " The Genetics of the Horse."—*Imp. Bureau Anim. Genet. Edinburgh*].—J. E.

PHÉLOUKIS, T. (1935). Contribution à l'étude de l'étiologie de la paraplégie infectieuse du cheval. [**Contribution to the Study of the Aetiology of Infectious Paraplegia of the Horse**].—*Bull. Acad. vét. Fr.* **8.** 44-52. [7 refs.]

This paper records an original piece of work having as its object the discovery of the causal agent of equine infectious paraplegia. The first part is a study of the organisms present in the blood, vaginal discharge and urine of affected animals. The author finds that streptococci and staphylococci only occur in the blood stream when the disease takes a fatal course. Urine and vaginal discharge showed a heavy incidence of various organisms, particularly *Bact. coli* and streptococci.

The second part is a report on organisms isolated *post mortem*. None were obtained from those organs which are regarded as the essential seats of the disease. Organisms found elsewhere were the same as those found during the life of the animal.

The third part is devoted to inoculation experiments with the organisms referred to above. They all proved incapable of reproducing the disease when injected into healthy animals.

In the fourth part the author reports two unsuccessful attempts to reproduce

the disease by the inoculation of healthy horses with the filtrate of an emulsion of spinal cord taken from an affected animal.

The author concludes that the causal agent is probably a filtrable neurotropic virus, but distinct from that causing Borna disease of horses. He regards as of no aetiological significance the organisms which he succeeded in isolating *ante* and *post mortem*.—C. DAVENPORT.

ENGELHARDT, H. (1934). Beitrag zur Hepatitis interstitialis chronica equorum. [**Chronic Interstitial Hepatitis of Horses**].—*Prag. tierärztl. Arch.* **14.** 221-225. [6 refs.]

Chronic interstitial hepatitis of horses is a definite clinical entity, characterized at the onset by an attack of colic which is followed by extreme apathy. Mucous membranes show slight icterus and the faeces are yellow and slimy. Symptoms appear during the course of one to three days and, if untreated, the disease progresses slowly but surely ; animals show signs of wasting, debility and prostration whilst a stage of excitation may appear when the horse damages itself against the sides of the box. *Post mortem* the liver shows a varying degree of cirrhosis including marked thickening of the walls of blood-vessels and bile ducts. The normal distribution of liver cells around the central vein is destroyed by the development of connective tissue elements and the cells degenerate. Diagnosis, differential diagnosis and prophylaxis are discussed.—E. J. PULLINGER.

COULOUMA, P. (1934). L'étude anatomique d'un rein atrophique chez le chien. [**Study of Renal Atrophy in a Dog**].—*Rev. Path. comp.* **34.** 253-263. 7 figs. [10 refs.]

A case of renal atrophy in an 18-month-old dog is described, apparently caused by a congenital malformation of the ureter. The arterial and venous distribution of the atrophic kidney is described in detail and compared with that of the other kidney.—J. R. M. INNES.

WAY, C., & HOFFMAN, G. L. (1935). **Chronic Equine Arthritis.**—*J. Amer. vet. med. Ass.* **86.** 508-518. [37 refs.]

This article is based on the theory that certain of the common bone and joint diseases in the horse are bacterial in origin. The subject matter of the paper is the application of this theory to practice. In the term chronic equine arthritis the authors include the whole of the present classification of bone and joint diseases in the horse, viz. joint-ill, navel-ill, spavin, ringbone, splints, curbs and many other conditions of bones and joints. They base diagnosis on the results of complement-fixation tests carried out against some 12 or 15 species of organisms isolated from various types of affection. Treatment is by vaccination, the vaccine being composed of those organisms against which positive results were given in the complement-fixation test. The authors claim a high measure of success in their work on these lines.—C. DAVENPORT.

JASINSKAS, K. (1934). Kiauliu isbérimai. [**Cutaneous Eruptions of Pigs**].—*Vet. ir Zootech. Kovno.* **11.** 241-243. [Abst. from French summary].

During the hot summer of 1934 a disease of pigs was observed in Lithuania. It was characterized by the appearance of reddish papules about 1 cm. in diameter on the lower surface of the body, sub-maxillary region and inside the thighs. Pruritus, inappetence and prostration were also present. After three or four days the papules gave place to blackish crusts, which tended to spread over the whole body. A spontaneous cure was usually observed after ten days' illness.—J. E.

Sjollema, B. (1933). Stoffwechselstörungen des Rindes. [**Metabolic Disorders of Cattle**].—*Acta vet. neerl.* **1.** No. 2. pp. 128. 4 figs., 9 tables. [Numerous refs.] [In German].

A review, mainly of papers from the author's laboratory, issued to commemorate his 25th year of office. Successive chapters deal with acetonaemia of cows, phosphaturia of cattle, milk fever, tetany in general, grass tetany in cows, metabolic disturbances of sheep analagous to milk fever ; therapy and preventive treatment of puerperal paresis and grass tetany, and nature and treatment of " lecksucht " (" licking disease " associated with deficiency of copper).—H. H. Green.

Sampson, J., & Hayden, C. E. (1935). **The Acid-Base Balance in Cows and Ewes during and after Pregnancy, with special reference to Milk Fever and Acetonemia.**—*J. Amer. vet. med. Ass.* **86.** 13-23. 3 figs. [31 refs.]

Data are given relative to the CO_2 capacity and the ketone and calcium content of the blood, and to the ketones and ammonia in the urine of both cows and ewes. A variety of conditions are dealt with, including normal pregnancy, milk fever, acetonaemia, pneumonia, retained placenta and pyelonephritis in cows, and normal pregnancy, encephalitis and pregnancy toxaemia in ewes. It is found that the serum calcium and the blood ketones are somewhat higher during pregnancy than during the first few days after parturition. In milk fever there is a lowering of the alkali reserve and the serum calcium. In acetonaemia in cows the blood ketones may be 20 times, and the urinary ketones 150 times, greater than the normal. A high ketone content of both blood and urine is also evident in pregnancy toxaemia in ewes. It is suggested that the ketosis in the last two conditions is due either to a lack of sufficient carbohydrate in the diet, or to an insufficient carbohydrate store in the body.—Henry Dryerre.

Carlström, B. (1933). **On Hypocalcaemic Morbid Conditions in Domestic Animals.**—*Skand. VetTidskr.* **23.** 229-272. 1 fig., 2 tables. [26 refs.] [In English : Swedish summary].

This is a review article including investigations by the author. It deals with balance of basic and acid ions in the blood in relation to neuromuscular irritability ; with tetany of bitches during lactation, hypocalcaemia of cattle at parturition (milk fever) or associated with tetany ; with puerperal paresis of other animals and hypocalcaemic conditions associated with rickets in growing animals. In order to explain the fact that hypocalcaemia may be associated either with increased or decreased nervous irritability (tetany or paresis) the author assumes that, in consequence of diminished Ca-ion concentration, the permeability of capillaries and cells is altered so that toxic products of metabolism (normally present) can penetrate neuromuscular elements in increased quantities.—H. H. Green.

Götze, R. (1934). Koma, Lähmungen und Krämpfe während der Mutterschaft und der Laktation (Milchfieber). [**Coma, Paresis and Tetany during Pregnancy and Lactation (Milk Fever)**].—*Berl. tierärztl. Wschr.* **50.** 849-854. 2 figs., 1 table. [3 refs.]

This is merely an article written for practitioners and contains no new aspects of any of the diseases described. It gives a differential clinical diagnosis of the various comas, pareses and paraplegias associated with pregnancy and lactation including milk fever, stomach staggers and grass tetany. The author theorizes regarding the cause of such disorders and describes at length the usual therapeutical measures to be used, concluding that a ration containing adequate protein, fat

and carbohydrate as well as a sufficiency of the necessary mineral elements, especially calcium and phosphorus, is the best means of prevention.—James Stewart.

Blakemore, F., & Stewart, J. (1933). **Some Observations on several Outbreaks of So-Called Lactation Tetany in Cattle.**—*Rep. Direct. Inst. Anim. Path. Univ. Cambridge, 1932-1933.* pp. 159-168. 2 figs. on 1 plate, 4 tables. [4 refs.]

A survey of " lactation tetany " in four districts suggested that the disease may be classified clinically as acute, sub-acute and chronic, although the biochemical findings (pronounced hypomagnesaemia and moderate hypocalcaemia) are very similar. The chronic form is of special interest since the symptoms (dullness, indifferent appetite, cachexia) are quite different from those of the acute form (tetanic convulsions) and may pass undiagnosed if hypomagnesaemia is not looked for.

Acetonuria and low CO_2 content of the blood were common features of acute cases and it is concluded that moderate acidosis is characteristic. Blood sugar was normal and inorganic P variable. Hypocalcaemia disappeared with recovery from the acute symptoms but return to normal of blood Mg was slower and in one case hypomagnesaemia was still pronounced (0·89 mg.) 36 days after recovery.

Pathological and bacteriological studies were made in some cases, but without definite results.—H. H. Green.

Green, H. H., Allcroft, W. M., & Montgomerie, R. F. (1935). **Hypomagnesaemia in Equine Transit Tetany.**—*J. comp. Path.* **48.** 74-79. 1 fig., 2 tables. [9 refs.]

The similarity existing between the symptoms of " lactation tetany " in cattle, and transit tetany in ponies, suggested a chemical examination of the blood in cases of the latter. During the transport by rail of 12 Welsh mountain ponies, five developed subacute transit tetany, and seven remained apparently normal. The mean values for the serum Ca and Mg of the former were 6·67 mg. and 1·16 mg. respectively, whilst the Ca and Mg in the normal animals averaged 11·3 mg. and 1·82 mg. Two weeks later, the average figure for the ponies which had been affected were, Ca 11·14 mg. and Mg 2·12 mg. The relationship of transit tetany to " lactation tetany " and milk fever is discussed, and it is concluded that it simulates " atypical lactation tetany ", which is characterized by a coincident hypocalcaemia and hypomagnesaemia. It is suggested that there is a group of clinically separable disorders involving disturbance of Ca and Mg metabolism explicable on a common physiological basis. Reasons are given for suggesting that it may be of cortical origin.—Henry Dryerre.

Kruse, H. D., Schmidt, Marguerite M., & McCollum, E. V. (1934). **Studies on Magnesium Deficiency in Animals. V. Changes in the Mineral Metabolism of Animals Following Magnesium Deprivation.**—*J. biol. Chem.* **106.** 553-572. 5 tables. [42 refs.]

In rats on a diet deficient in magnesium, excretion of magnesium decreases progressively. Excretion of phosphorus is inconstant but not excessive. During the early stages, the course of calcium metabolism is towards increased retention but in the later stages elimination increases progressively, probably because of general nutritive failure. The retention of calcium and phosphorus is entirely, and that of magnesium largely, due to diminished output in the faeces.

The urinary data on acid and ammonia excretion show absence of alkalosis,

thus supporting the blood findings which previously identified magnesium tetany as a separate entity.—H. H. Green.

Orent, Elsa R., Kruse, H. D., & McCollum, E. V. (1934). **Studies on Magnesium Deficiency in Animals. VI. Chemical Changes in the Bone, with Associated Blood Changes, Resulting from Magnesium Deprivation.**—*J. biol. Chem.* **106.** 573-593. 5 tables, 1 chart. [38 refs.]

On a diet deficient in magnesium, white rats showed increased bone development, the increased weight being largely due to excessive calcification so that the bone differed from normal bone in having a high percentage of calcium. Although the animals received less magnesium in the diet than they excreted their bones still showed deposition of this element, thus indicating a redistribution within the body.

During the few seconds preceding the first stage of induced hypomagnesaemic convulsions, the Mg level rose in the blood and dropped sharply in bone. This extraordinarily rapid mobilization of Mg is of great interest in connection with the composition and metabolism of bone.—H. H. Green.

I. Filmer, J. F., & Underwood, E. J. (1934). **Enzootic Marasmus. Treatment with Limonite Fractions.**—*Aust. vet. J.* **10.** 83-87. 1 table. [8 refs.]

II. Underwood, E. J. (1934). **Enzootic Marasmus. Iron Content of Liver, Kidney and Spleen.**—*Ibid.* 87-92. 3 tables. [10 refs.]

I. In a previous paper [this *Bull.* **5.** 40.] evidence was advanced that this disease, which is similar to " bush sickness ", " nakuruitis ", " salt-sick " and " pine ", was not due to a deficiency of iron, as had been believed, and it was suggested that the cause was deficiency of some mineral necessary for the metabolism of iron. Further work recorded here supports this theory. Extracts with 0·125 N. HCl. were made of limonite, an iron ore, which is effective in preventing and curing the disease. After discussing the available data, this is considered to be the greatest acidity which is likely to be reached in the abomasum. This acid extract proved to be effective in curing the disease, while the residue, which contained many times as much iron, did not. The acid extract was then separated into two fractions, one containing practically all the iron and the other, the " iron-free " extract, only a trace (0·0002 g. per dose). The " iron-free " extract effected a cure while the fraction containing the iron, which was in a readily soluble form, did not. This proves that enzootic marasmus is not due to a deficiency of iron in the food. Further work is planned to determine, if possible, what is the substance contained in the " iron-free " extract which exerts a curative effect.

II. In connection with the work described in I, an investigation was made of the iron content of livers, kidneys, and spleens of animals affected with enzootic marasmus as compared with that of normal animals. The data available concerning the iron content of these organs is discussed. Analyses were carried out on nine young sheep and two calves affected with the disease, and on six normal sheep, normal values for calves being available in the literature. The livers of all, and the kidneys and spleens of nearly all of the affected animals showed markedly higher concentrations of iron than any of the normal animals. For instance, the total iron stored in the livers of diseased sheep was 4·13 mg. per lb. live weight as compared with 0·56 mg. in normal sheep. This evidence again demonstrates that enzootic marasmus is not due to a deficiency of available iron in the food, and the large accumulation of iron in the organs suggests the absence from the food of some factor necessary for the utilization of iron.—W. I. B. Beveridge.

I. Hopkirk, C. S. M. (1934). **Pregnancy Toxaemia of Ewes.**—*Aust. vet. J.* **10.** 59-64 and 120. 3 tables. [11 refs.]

II. Rose, A. L. (1934). **Pregnancy Toxaemia of Ewes.**—*Ibid.* 111-117. [9 refs.]

I. While in other countries pregnancy toxaemia appears to be nearly always associated with an over-fat condition of the ewes, nearly every outbreak in New Zealand has been associated with a falling off in the ewe's condition.

Nine pregnant ewes were placed on a restricted diet of half a pound of hay per day and analyses of blood and urine carried out. Seven of these ewes developed pregnancy toxaemia. There was a tendency for the blood phosphorus and sugar to rise just before lambing occurred or coma supervened. In pregnant ewes running under normal conditions this change did not occur. Acetonuria occurred in the affected ewes, but albuminuria was not always present. A mineral mixture was administered to three of the experimental ewes, but had no effect in preventing the disease. Urine and blood from the uterine and portal veins and from the posterior vena cava of the foetus were collected from naturally occurring cases and inoculated into mice. The mice showed no symptoms.

The following therapeutic measures were tried without success :– inoculation of glucose, insulin, calcium chloride, formaldehyde, adrenalin and sodium bicarbonate. It is concluded that the disease is a ketosis and intoxication from absorption of waste products from the lambs, which the liver, in its state of intense fatty infiltration, whether from over-feeding or from starvation, cannot cope with.

Outbreaks which are due to calcium deficiency are said to occur often, and these respond to calcium treatment. When pregnancy toxaemia occurs, the diet should be changed and, in cases where loss of condition is the cause, placing the ewes on young green pasture is particularly helpful.

II. This is a record of extensive field observations on pregnancy toxaemia carried out in southern New South Wales, over a period of seven years. The incidence of the disease shows a very definite relation to poor pasture conditions. This observation supports Hopkirk's work, which now offers a satisfactory explanation for it. The heavy losses which pregnancy toxaemia causes might be avoided if supplementary feeding were commenced earlier than is usually done. An instance is also given where the disease was brought on by a train journey which entailed a three-day fast. Massive, sudden infestation of sheep of either sex with *Haemonchus contortus* has been observed to produce a marked fatty condition of the liver. In this condition a rapid loss of weight precedes death and it is thought that the immediate cause of death may be an acidosis similar to that of pregnancy toxaemia.—W. I. B. Beveridge.

Piercy, S. E. (1934). **" Cripples " in Lambs. II.**—*Vet. J.* **90.** 223-231. 4 tables. [7 refs.] [For abst. of previous article of this series, see this *Bull.* **4.** 535].

In relation to the study of this disease pregnant ewes were fed in five lots, for periods up to five months, on rations of varying mineral content, and blood changes followed in respect of haemoglobin, calcium and inorganic phosphorus. Despite malnutrition and symptoms of deficiency of Ca or P or both in the ewes, the lambs were born normal. The conclusion drawn from correlative field experiments that " cripples " is not due to mineral deficiency of the pastures is therefore substantiated.—H. H. Green.

I. Theiler, A. (1934). **The Osteodystrophic Diseases of Domesticated Animals. (1) The Structure of the Bone; Atrophy; Osteoporosis; Osteomyelitis. (2) Rickets and Osteomalacia. (3) The Osteodystrophia Fibrosa.**—*Vet. J.* **90.** 143-158, 159-175 and 183-206. 28 figs. on 12 plates. [139 refs.]

II. Theiler, A., & Green, H. H. (1934). Les dystrophies osseuses des animaux domestiques. [**The Osseous Dystrophies of Domestic Animals**].—*Bull. Off. internat. Epiz.* **8.** 19-117. [299 refs.]

I. The aetiology and comparative pathology of osteoporosis, rickets, osteomalacia and osteofibrosis are discussed, bone lesions being illustrated by original photomicrographs.

Osteoporosis is treated as the result of bone absorption which rarely appears as a final uncomplicated pathological state but usually as a stage in the evolution of some disease the last phases of which are not always reached.

Osteodystrophia malacia (rickets and osteomalacia) and osteodystrophia fibrosa (osteofibrosis) in the domesticated animals are classified as dietary diseases even if dietary deficiencies are not the only factors in causation.

In cattle and sheep rickets and osteomalacia occur in pure forms, and osteofibrosis has not been recorded. In pigs, osteodystrophia malacia occurs in a pure form, but also complicated with osteodystrophia fibrosa. In dogs rickets is more common than osteofibrosis. In horses and goats osteofibrosis is the common bone disease although it is often erroneously described as osteomalacia.

Although osteodystrophia malacia, as observed in practice, is pathologically the same in all the domestic animals its aetiology is different ; in bovines and ovines it occurs primarily as an aphosphorosis, in pigs as an acalcicosis and in dogs as an avitaminosis.

In the case of osteodystrophia fibrosa evidence of causation is clearest for the horse ; it is liable to occur in equines whenever the ratio of $CaO : P_2O_5$ in the diet is wider than 1 : 2. It has been experimentally produced in healthy horses as a hyperphosphorosis on a ration loaded with phosphorus-rich bran but containing adequate calcium (26 g. CaO : 130 g. P_2O_5) and also as an acalcicosis in a ration restricted to barley grain (2·1 g. CaO : 27·5 g. P_2O_5). It therefore arises from mineral imbalance rather than from absolute deficiency and is a disease of artificially fed horses and not of pasture animals.

II. This article is a sequel to the earlier review by the same authors " Aphosphorosis of Ruminants " [this *Bull.* **2.** 391.] which was republished in French by the Tropical Committee of the International Institute of Agriculture, Rome. The earlier publication dealt with the world distribution, aetiology and prevention of osteomalacia and rickets in cattle and sheep from the point of view of mineral deficiency. The present review deals with the osteodystrophic diseases of the domesticated animals, including osteodystrophia fibrosa, and treats the subject from the pathological and clinical points of view as well as from the point of view of causation and distribution.

Difficulties in nomenclature are first discussed and a short sketch of the physiology of bone is given. The experimental production of osteoporosis, osteomalacia, rickets and osteofibrosis in various animals is next considered and the clinical and pathological pictures described. The osteodystrophic diseases are then discussed in relation to their occurrence under natural conditions in various parts of the world, to the evidence of aetiology in different animals, to their clinical and pathological manifestations, and to prevention. The incidence in Europe is compared with incidence in tropical and subtropical countries with special reference to causal factors and to the more obscure forms of osteodystrophic disorders in Europe. An extensive and useful bibliography is appended.—H. H. Green.

Olver, A. (1933). **Osteoporosis in North India** [**Horses**].—*Indian J. vet. Sci.* **3.** 350-355. 2 figs. on 1 plate. [8 refs.]

A discussion of the occurrence of this disease in India and Burma with a

detailed clinical and *post-mortem* description of a typical case. Causation is discussed in the light of the work of CRAWFORD in Ceylon and KINTNER and HOLT in the Philippines. [For comparative pathology of this disease see THEILER, p. 584].—H. H. GREEN.

SUMULONG, M. D. (1934). **Observations on the Bones of Native Horses Affected with Osteomalacia.**—*Philipp. J. Sci.* **53.** 141-155. 2 text figs., 4 plates, 3 tables. [13 refs.] [An abbreviated report appears in *Philipp. J. anim. Indust.* **4.** 53-56].

Dried macerated bones of seven male and three female native Philippine horses were examined mechanically, chemically and to some extent histologically. The main features correspond with those described by other workers. The term osteomalacia is still used, as in the case of the paper by KINTNER and HOLT [this *Bull.* **3.** 264.] but the recognized pathological designation is now osteodystrophia fibrosa or osteofibrosis [compare THEILER, p. 584].—H: H. GREEN.

BERGE, & PALLASKE. (1934). Osteodystrophia generalisata beim Pferd. (Beitrag zur Kenntnis der Knochensystemerkrankungen der Tiere). [**Generalized Osteodystrophy in the Horse**].—*Berl. tierärztl. Wschr.* **50.** 385-389 and 401-406. 9 figs. [23 refs.]

This paper is a detailed pathological study of the complete skeleton of a one and a half year old Shetland pony with osteodystrophia fibrosa, well illustrated by photomicrographs. A good discussion of the condition is given from the point of view of comparative pathology but the aetiology is left obscure [compare THEILER, p. 584].—H. H. GREEN.

BOSWORTH, T. J., & STEWART, J. (1933). **A Defective Condition of the Bones of Sheep in Certain Areas.**—*Rep. Direct. Inst. Anim. Path. Univ. Cambridge, 1932-1933.* pp. 33-45. 7 figs. on 4 plates, 5 tables. [8 refs.]

A study of the condition known in Yorkshire as " double scaup " and in Northumberland as " cappi ", correlated with " drying " a wasting disease of young sheep sometimes recognizable in lambs a few months old but becoming progressively worse on poor winter pasture. Loss of condition is generally associated with heavy worm infestation resulting in anaemia followed by dropsy. Marked fragility of the skull is easily recognizable on percussion but histological examination of limited skeletal material showed extensive generalized osteoporosis and bone atrophy without, however, any clear evidence of osteodystrophia malacia. Mineral content of pasture and inorganic phosphate of blood were low but not diagnostically so. The authors suggest that the complete syndrome can be explained by assuming a combination of factors involving reduced mineral assimilation associated with parasitic infestation.—H. H. GREEN.

MELLANBY, May. (1934). **Diet and Teeth: an Experimental Study. Part III. The Effect of Diet on Dental Structure and Disease in Man.** —*Spec. Rep. Ser. med. Res. Coun., Lond.* No. 191. pp. 180. 3 text figs., 187 figs. on 55 plates, 80 tables, 6 graphs. [Numerous refs.] London: H.M. Stat. Off. [8vo] [5s.]

This is the concluding part of Mrs. Mellanby's extensive studies on the effect of diet on teeth. The two previous parts dealt mainly with animal experiments, while in this part the results already obtained with animals are extended to children, with the particular object of determining whether dental caries is a

nutritional disease, and can be prevented and cured by suitable adjustments of the diet.

Careful examination of the surface texture of teeth, combined with histological examination, has made it possible to predict the histological structure of the enamel and dentine of a tooth while still in the mouth. The normal tooth is taken as the perfect tooth, and it has been found that the teeth of children in this country are largely defective, 40 per cent. of the incisors and 90 per cent. of the molars being hypoplastic.

It is shown that normal teeth are more resistant to caries than those which are hypoplastic in structure. The onset and spread of caries can, however, be inhibited by a diet rich in vitamin D and adequate in calcium and phosphorus and containing no cereals. The incidence of caries was found to be higher in children who had suffered from severe rickets than those in other groups. The racial distribution of caries is discussed, and it is shown that, although it has been widespread since primitive times, there are a number of populations free from the disease. This is explained by the diets being free from cereals, and balanced with regard to vitamins A and D, and Ca and P. These races may, however, contract the disease by changing over to a " civilized " diet, rich in cereals and inadequate in essential vitamins and minerals. The author suggests that, to ensure good teeth in children, breast feeding should be continued up till one year or more, supplemented by iron and vitamin C, more milk, eggs, cheese, animal and fish fats and vegetables, that less cereals be given, and sufficient vitamins A and D. It is agreed that the exciting cause of dental caries is probably a micro-organism, but that the initiation and spread of the disease are determined largely by faulty structure and diminished resistance.—G. D. Shearer.

Murnane, D. (1934). **Sarcophagia in Herbivorous Animals.**—*J. Coun. sci. industr. Res. Aust.* **7.** 143-144.

It has frequently been observed in Australia that cattle and sheep running on phosphorus and/or protein-deficient pasture eat bones and even raw flesh. Some observations were carried out on the experimental reproduction of this condition. Two sheep which received a low protein ration for nine weeks ate raw rabbit flesh readily when it was offered. Sheep on the same diet but receiving a supplement of linseed " nuts " or meat-meal refused the flesh. In another experiment two sheep were placed on a low protein ration for eight weeks and then offered both bone meal and raw rabbit flesh. Bone meal was eaten to the extent of 24 oz. per head, but the raw flesh was not touched.—W. I. B. Beveridge.

PUBLIC HEALTH.

—. (1934). **Milk Act, 1934.** pp. 18. London : H.M. Stat. Off. [4d.]

This Act makes temporary provision, by means of Government subsidies, for securing for milk producers a minimum return for milk used in the manufacture of milk products, for improving the quality of the milk supply and increasing the demand for it.

Sections 1 to 8 deal with the financial machinery of the scheme. Section 9 provides for the expenditure of £750,000, spread over four years, with the object of ensuring that the milk supplied for human consumption in England and Scotland is pure, and free from any infection. Before the end of the four-year period, the Minister may make an order for securing that the Milk Marketing Boards shall pay to registered producers, who have satisfied the requirements as to purity of

the milk and its freedom from disease, the sum of 1d. per gallon in respect of such milk.

Section 10 amends Section 3 of the Milk and Dairies Amendment Act of 1922, and provides for the issue of Orders by the Minister of Health after consultation with the Ministry of Agriculture, for special designations of milk, for the issue of milk licences in relation to such milk, and for the punishment of infractions of the Orders.

Section 11 authorizes the Minister to pay to Milk Marketing Boards a sum not exceeding one-half of the expenditure incurred in carrying out schemes for increasing the demand for milk, not more than £1,000,000 being allowed for this purpose.

Section 12 extends the functions of Milk Marketing Boards and enables them, *inter alia*, to subsidize registered producers of milk produced in circumstances determined by the Minister or by the Board, with the object of securing that the milk is pure and free from infection.—F. Bullock.

THERAPEUTICS.

Perla, D. (1934). **The Protective Action of Copper and Iron against *Trypanosoma lewisi* Infection in Albino Rats.**—*Amer. J. Hyg.* **19.** 514-520. 2 tables. [13 refs.]

A marked reduction in the severity of the trypanosome infection occurred in rats receiving supplementary rations of copper or iron when inoculated with *T. lewisi*, but no such reduction in severity occurred with a supplementary lead ration. No reduction in the severity of the trypanosome infection occurred in rats fed on a copper-free diet (milk) to which a normal copper ration was added. A large proportion of the rats fed on the milk diet, with or without the addition of copper, succumbed to the *T. lewisi* infections, whilst all controls fed on normal diet recovered. The author considers that the experiments illustrate the role of copper in the maintenance of resistance to protozoan infection, and explains the rather more severe reactions in the group fed on milk to which copper was added by a favourable influence of the small ration of copper on the growth of the protozoa.
—U. F. Richardson.

Marshall, R. S., Lester, H. M. O., & Jones, A. G. F. (1935). **Some Experiences with Potassium Antimonyl Tartrate in the Treatment of Bovine Trypanosomiasis in Nigeria.**—*J. comp. Path.* **48.** 58-67. 2 tables. [9 refs.]

This article records experiments on the value of tartar emetic in the treatment of cattle infected with *Tryp. congolense* and *T. vivax*, or with mixed infections with these trypanosomes. The tartar emetic was given intravenously in doses of 0·06 c.c. to 0·08 c.c. of a 4 per cent. saline solution per kg. body weight, the maximum dose being 24 c.c. It was found that 1 g. doses were too large for Nigerian cattle and the average dose was reduced to 0·5 g., or 12·5 c.c. of the 4 per cent. solution. In one experiment, treatment was given every second or third day, and in the other experiments it was given at weekly intervals. In most experiments in which *T. congolense* was involved, all the untreated controls died whilst the mortality in untreated animals infected with *T. vivax* was about 50 per cent. The mortality in the treated animals varied from 28 to 74 per cent. The authors suggest that the discrepancies reported by various observers in the value of tartar emetic treatment are due to variations in the virulence of the trypanosome strains and in the susceptibility of the cattle. [In the successful treatment of *T. congolense* in cattle reported from Uganda – this *Bull.* **5.** 534.– tartar emetic was administered at daily, not weekly, intervals].—U. F. Richardson.

Hindersson, R., & Åström, B. (1934). Om behandling av piroplasmos hos nötkreatur. [**Treatment of Piroplasmosis in Cattle**].—*4. Nord. Vet.-mötet. Helsingfors. 1933.* pp. 840-882. 2 figs., 18 tables. [15 refs.] [German summary : abst. from orig.]

The therapeutic efficacy of " ichthargan " (a silver compound) and trypan blue in treatment of *Babesia bovis* infection in cattle is discussed. The authors found " ichthargan " more suitable (100 c.c. of a 1 per cent. solution given intravenously) as the mortality in the animals treated was only 7 per cent. and recovery was established in 60 hours on an average, whereas after treatment with trypan blue the mortality was 11·5 per cent. and recovery occurred only in 96 hours. With " protargol " the mortality was 12 per cent. Altogether 608 cases were treated in these investigations : 22 cases were carefully examined after treatment, especially as regards the blood picture and haemoglobin content. Some statistical figures regarding the incidence of the disease and the age of affected animals are also given. In the discussion which followed this paper, Pettersson (Sweden) recommended a large dose of digitalis followed by blood transfusion (1 to 3 litres) in severe cases. Söderlund (Helsingfors) stated that he had found " ichthargan " very unsuitable owing to its strongly haemolytic effect. He recommended the non-haemolytic silver compound " protargol ".—Gustav Naerland (Farsund).

Gousseff, W. F., Parkhomtschik, W. P., & Iwanoff, E. I. (1935). Die spezifische Heilkunde der Piroplasmose des Rindes in Weissrussland. [**Specific Therapy for Bovine Piroplasmosis in Russia**].—*Z. InfektKr. Haustiere.* **47.** 138-146. 4 tables.

The article discusses experiments with therapeutic measures for bovine piroplasmosis, including cases of mixed infection with *Babesiella* [*Babesia*] *bovis*, *Françaiella caucasia* and *Fr. occidentalis*. Preparations of " ichthargan ", " albargin ", " protargol " and arrhenal were used. " Ichthargan " was administered in doses of 1 to 1·5 g. as an alcoholic sodium sulphate solution. Using this preparation, six cases of *B. bovis* and six of mixed infection recovered. " Albargin " was administered in doses of 2 g. Out of 19 bovines treated, 17 recovered. " Protargol " in doses of 4 g. cured four cases of mild infection. Arrhenal in doses of 3 g. cured 12 mild cases, though parasites persisted in the blood for some hours after treatment. In the case of the silver preparations, " ichthargan ", " albargin " and " protargol ", the ring-shaped types appeared the most resistant during the course of destruction of the parasites, surviving for at least 24 hours after treatment.—E. J. Pullinger.

Els, T. (1934). Contribution à l'étude de la chimiothérapie de l'East Coast Fever. [**Chemotherapy of East Coast Fever**].—*Bull. agric. Congo belge.* **25.** 205-216. 4 tables.

This paper records the treatment of six cattle with " gonacrine " and four with " trypaflavine " in an outbreak of acute East Coast fever at Stanleyville ; all the animals died. After the injection of both drugs, the only noticeable effect on the parasite was a complete disappearance of blue bodies from the peripheral blood, but the author considers that this phenomenon was probably accidental.

All the animals exhibited pulmonary oedema, acute nephritis and heart failure, but only a general congestion of the viscera. Similar lesions were encountered in untreated animals and, although " gonacrine " and " trypaflavine " have been shown to produce nephritis and albuminuria in the rabbit, it is considered that in these cases the lesions were produced by the disease.—U. F. Richardson.

POWELL, H. M., & JAMIESON, W. A. (1934). **On Merthiolate and Fungi Associated with Ringworm.**—*Proc. Ind. Acad. Sci.* **43.** 56-70. 7 figs., 5 tables. [21 refs.]

The authors describe their investigations on the fungicidal and fungus-inhibiting action of merthiolate and state that this preparation has a strong " test-tube " action on fungi of human origin. Their investigations were also directed to determine whether more effective skin medication could be obtained by using a stearate " cream " vehicle for the merthiolate. Experiments revealed that a special semi-solid " cream " base used did not impair the action of merthiolate. —GWILYM O. DAVIES.

WASSILIEFF, A. (1935). Un procédé éfficace et inoffensif de désinsection des animaux de laboratoire. [**An Inoffensive and Effective Method of Ridding Laboratory Animals of External Parasites**].—*Arch. Inst. Pasteur Tunis.* **24.** 134-138. 1 table.

The author describes " péréatox " an insecticide which, on being heated in a special apparatus, gives off a gas [nature not given] toxic to fleas, lice and nits, but not to their hosts. Rats are treated in a box of 1 to 2 c.m. capacity, the door being provided with a hole through which the gas is introduced for a period of 30 seconds. An exposure of 15 minutes is sufficient to destroy fleas and lice, while nits require 45 to 50 minutes. In the case of dogs and cats the box has a hole in the top through which the head is passed. Horses may be similarly treated. It is noted that parasites concentrate on the heads of the larger animals, which may be treated with " perfauna ", a preparation which has proved efficacious in the experimental treatment of mange in rats.—NORMAN BISSET.

KRAGE, P. (1935). Die Bekämpfung des gelben Galtes mit Hilfe der Entozon-behandlung. [**Control of Mastitis with the Aid of " Entozon " Treatment**]. —*Dtsch. tierärztl. Wschr.* **43.** 61-62.

Krage's results refer to the treatment of 69 infected cows in three herds containing 227 cows. In herd A, the percentage of infected cows was 27·3 before treatment, 19·7 after two treatments and 13·5 after three, but it again rose to 21·4 per cent. in the next three months. In herd B the figures were 32, 14·8, 10·2 and 17·6 per cent. respectively. About half the infected cows in these herds were, therefore, free from infection three months after treatment. In herd C the figures were 32·1, 27·9, 28·4 and 36·9 respectively. The difference is ascribed to the absence of satisfactory hygienic measures in herd C. Acute cases are believed to respond better than chronic cases.—A. W. STABLEFORTH.

CHATIN, M. G. (1934). **Sodium Hyposulphite and Hydrochloric Acid in the Treatment of Equine Mange.**—*Sovyet. Vet.* No. 11. pp. 76-79. [Abst. from French summary].

The value of the treatment was tested on 30 horses in different stages of the disease, the details being as follows :– the horse is clipped, washed and scabs removed ; it is then rubbed all over with 60 per cent. hyposulphite solution ; when dry 10 per cent. hydrochloric acid is rubbed in : repeat four times, preferably on the same day. In severe cases, leave the horse to dry after a maximum of two and a half complete applications, and finish with the acid solution next day. Two carefully applied courses should effect a cure in all cases. Friction lasts 25 to 30 minutes. Drying after the hyposulphite takes 40 to 45 minutes and after the acid 90 minutes. The author looked for evidence of toxic effects by analysis of the urine and examination of the blood before and after treatment, and no contra-indications to this treatment were found.—C. V. WATKINS.

PHYSIOLOGY.

LANDAUER, W., UPHAM, Elizabeth, & RUBIN, Fay. (1935). **Studies on the Creeper Fowl. VIII. The Effect of Bone Extract on Skeletal Growth and the Phosphatase Content of the Bones.**—*J. biol. Chem.* **108.** 121-126. 1 table. [7 refs.]

A watery extract of the epiphyseal-diaphyseal junction of calves' bones was injected subcutaneously into 20 creeper [an inherited peculiarity in which the fowls have very short legs] and 20 normal chicks, from the age of two days until they were eight weeks old. A similar number of each type of chick was kept for control purposes. They were all killed at the eighth week, and measurements made of body and bone lengths. The injections had no effect upon the size of the body as a whole, or upon the absolute or relative lengths of the bones. This was in contradistinction to the findings of ZAWISCH-OSSENITZ in rabbits and cats. The phosphatase activity of the bones of normal and creeper chicks are the same. Both types of bone show the same decline of phosphatase activity between the ages of three weeks and two months.—HENRY DRYERRE.

GRINI, O. (1935). Die Trächtigkeitsdiagnose bei der Stute nach der Methode Friedmann-Schneider. [**Pregnancy Diagnosis in the Mare by the Friedmann-Schneider Method.**]—*Arch. wiss. prakt. Tierheilk.* **68.** 397-402. 1 table.

Grini speaks highly of the convenience of the Friedmann-Schneider pregnancy diagnosis method [this *Bull.* **4.** 782]. He tested it with blood serum of 38 mares, and declares it to be as reliable as the Aschheim-Zondek reaction.—J. E.

LINTON, R. G. (1934). **The Economic Possibilities of Scientific Nutrition.**—*Vet. Rec.* **14.** 911-913. 2 tables. [2 refs.]

The author outlines some recent advances in the nutrition of farm animals, and discusses whether, economically, the farmer is justified in putting them into force. He describes some experiments carried out by himself, showing the great live-weight increase of chicks supplied with separated milk over those supplied with water, but the egg production of the two groups was exactly the same.

Linton emphasizes the value of pasture analyses over an extended period and advocates a systematic survey of the pastures of Great Britain.

From September to April grass on hill pastures has a very low nutritive value and, although production can be increased by feeding supplementary rations during that time, it is questionable whether the procedure is economically sound.

Lack of proper food seems to be a predisposing cause of losses from helminth infestations but, again, the question arises whether provision of additional food is a paying proposition.—G. D. SHEARER.

OFFICIAL AND OTHER REPORTS.

DOMINION OF CANADA. (1934). **Seventeenth Annual Report of the National Research Council Containing the Report of the President and Financial Statement 1933-1934.** pp. 149. Ottawa. [8vo].

Points of veterinary interest, which were all dealt with through research committees and grants to independent veterinary institutions, are as follows :–

PARASITOLOGY.—A new wing was added to the McGill University Institute of Parasitology [CAMERON, T. W. M.] for the housing of experimental animals. The library maintains a card index summary of relevant papers beginning from

1932. The parasitological survey of Canada was continued and much new material was obtained.

PARNELL found that urine, even when diluted with an equal volume of water, was rapidly lethal for strongyle eggs and larvae in faeces. Attempts are being made to turn this to practical advantage.

SWALES continued his study of the liver fluke and parasites of wild duck in Alberta.

Nodular disease of sheep, ascarids of swine and *Setaria labiatopapillosa* in cattle also received attention. The latter worm causes lesions resembling those of tuberculosis.

GRIFFITHS also studied the liver fluke, in the lower St. Lawrence area.

CONKLIN, of Macdonald College, reported on the wide-scale anthelmintic treatment of sheep in Quebec province. A general marked improvement was reported. A campaign was also undertaken against horse bots in ten horse-breeding syndicates, the results being very successful. Noteworthy conditions observed included bovine coccidiosis in Nova Scotia and verminous infestation of an equine placenta.

The Director began experiments on the *in vitro* cultivation of nematodes by means of an " artificial intestine ".

TUBERCULOSIS.—

" Experiments with B.C.G. (Bacillus Calmette-Guérin) have been continued since 1925 without financial assistance from the committee. Each year one or more groups of calves were inoculated with B.C.G. administered subcutaneously into the dewlap, and groups of unvaccinated calves were used as controls, both the vaccinated and unvaccinated groups being subsequently exposed to contact with active cases of tuberculosis over long periods. Necropsies have been conducted on 54 vaccinated and 56 unvaccinated animals, all of which had been maintained under similar conditions. The proportion of animals remaining macroscopically free from tuberculosis was the same in both cases, 16·6%. Of the vaccinated animals affected with the disease, 50% showed lesions of the caseo-purulent type as against 10% for the unvaccinated, lesions of the caseo-calcareous or calcified types being 50 and 90%, respectively."

Research on BCG has also been carried out by the University of Alberta.

" This work has been directed for some years towards finding definite answers to the questions whether B.C.G. as administered by various methods is harmless to cattle and whether it confers resistance upon animals exposed to tubercular infection. The first of these questions can now be answered with some assurance and evidence is being accumulated in regard to the second, but a complete answer to the second cannot be obtained for some years. In relation to the second question valuable information is being accumulated as to the possibility of building up from infected stock a herd of vaccinated animals and of maintaining them in good health."

At the University of Toronto, an investigation into the bovine type of infection in human beings showed that, in children under 14 years of age, 14·5 per cent. of cases are caused by this type and that the mortality is 8 per cent. In adults, 2·5 per cent. of cases were of the bovine type of infection and 25 per cent. of such cases died.—J. E.

MCEWEN, A. D. (1935). **Report of Veterinary Department, 1933-1934.**—*J. S.-E. agric. Coll. Wye.* No. 35. pp. 45-57. 4 tables.

" STRUCK " [A FORM OF ENTEROTOXAEMIA OF SHEEP].—During the winter of 1933 to 1934, 4,000 sheep were vaccinated twice with the modified toxin of the causal organism, nearly an equal number in each flock being left as controls.

It is considered that in flocks naturally liable to an appreciable mortality from " struck ", vaccination appeared to reduce the losses considerably.

" GANGRENE " [*Cl. chauvoei* INFECTION – BLACKLEG IN SHEEP].—Some successful results with serum treatment are given.

Acute Haematogenous Jaundice in Sheep.—This is said to be similar to the toxaemic jaundice of sheep in Australia. The jaundice is the result of liver dysfunction secondary to an acute destructive anaemia.

" The cause of the disease remains obscure as bacteriological examinations have yielded negative results and sheep inoculated with blood, emulsion of spleen pulp, emulsion of liver, emulsion of kidney, bile, and urine from an animal slaughtered in the last stages of the disease, have remained well, as did a sheep fed with the stomach contents of the slaughtered animal. The affected sheep on the farm had grazed in meadows, orchards and hop gardens after hopping was over, but there was no evidence that death was caused through the ingestion of food or water contaminated with toxic sprays, nor did it appear probable that the ingestion of toxic plants was responsible."

Infectious Entero-toxaemia or Pulpy Kidney Disease.—Three small outbreaks were noticed; it is at present only sporadic in Kent.

Johne's Disease.—Small losses were observed in the same flock as referred to in the previous year's report [this *Bull.* **4.** 451]. It is hoped that a comprehensive investigation into the disease will be made possible.

Parasitic Gastritis and Enteritis.—A flock of 144 lambs was treated with (1) carbon tetrachloride in liquid paraffin; (2) strong aqueous solutions of copper sulphate and nicotine sulphate, and (3) dilute solutions as in (2). The third remedy was most efficacious as judged by the mortality which occurred over a two-month period.

Bovine Contagious Abortion.—Thirty herds of cattle were under control for the purpose of eradication by blood testing and segregation. Results are so far very satisfactory. An avirulent vaccine is being tested on a small scale.

The report concludes with a few general notes on the work of the department.

—J. E.

—. (1935). **The Eighth All-India Veterinary Conference, Bombay, 1934.**—*Indian vet. J.* **11.** 201-247.

The Conference met at Bombay on the 29th and 30th December, 1934. In his presidential address Khan Sahib N. D. Dhakmarvala, late of the Bombay Veterinary College, dealt with animal welfare in India, paying particular attention to horse breeding, the milk industry, cattle disease legislation and the improvement of livestock. An exhibition of veterinary instruments, biological products and pathological specimens was appreciated including a demonstration of the use of several of the instruments.

Papers were read on the preventive treatment of rinderpest and on rural development. Clinical treatment received considerable attention, a number of reports being received and discussed.—G. K. Walker.

Beller, K. (1935). Ein Jahr Landwirtschaftlich- Tierärztliche Hochschule Ankara. [**The First Year of the Agricultural and Veterinary College at Ankara, Turkey**].—*Berl. tierärztl. Wschr.* **51.** 28-30. 2 figs.

This is an interesting but incomplete account of the first year's development of the new Turkish Veterinary College at Ankara.

All but one of the seven professorial chairs are occupied by men drawn from similar positions in Germany. The names of three are given (Stetter – Pathology, Lutz – Surgery and Sprehn – Parasitology). Nearly all the Turkish " Oberassistenten " are also German-trained.—J. E.